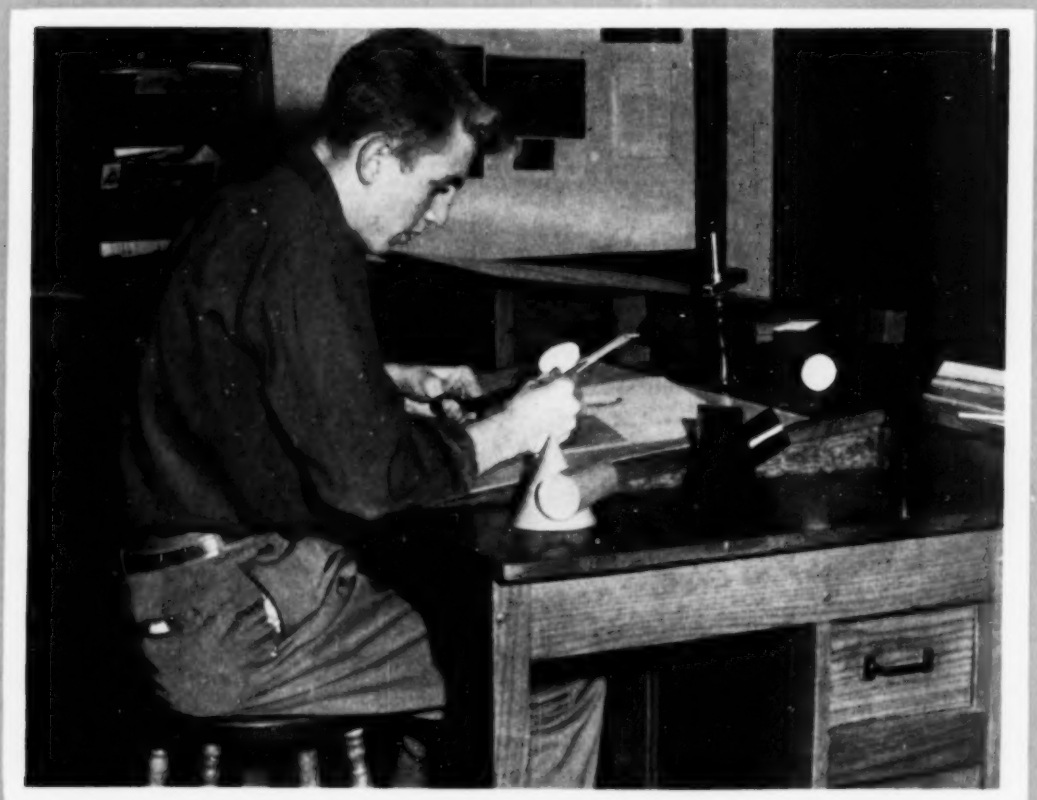
MAY, 1954 Vol. 43, No. 5

Industrial Arts and Vocational Education

1914 40th Anniversary Year 1954

THE SHOP TEACHERS' PROFESSIONAL MAGAZINE



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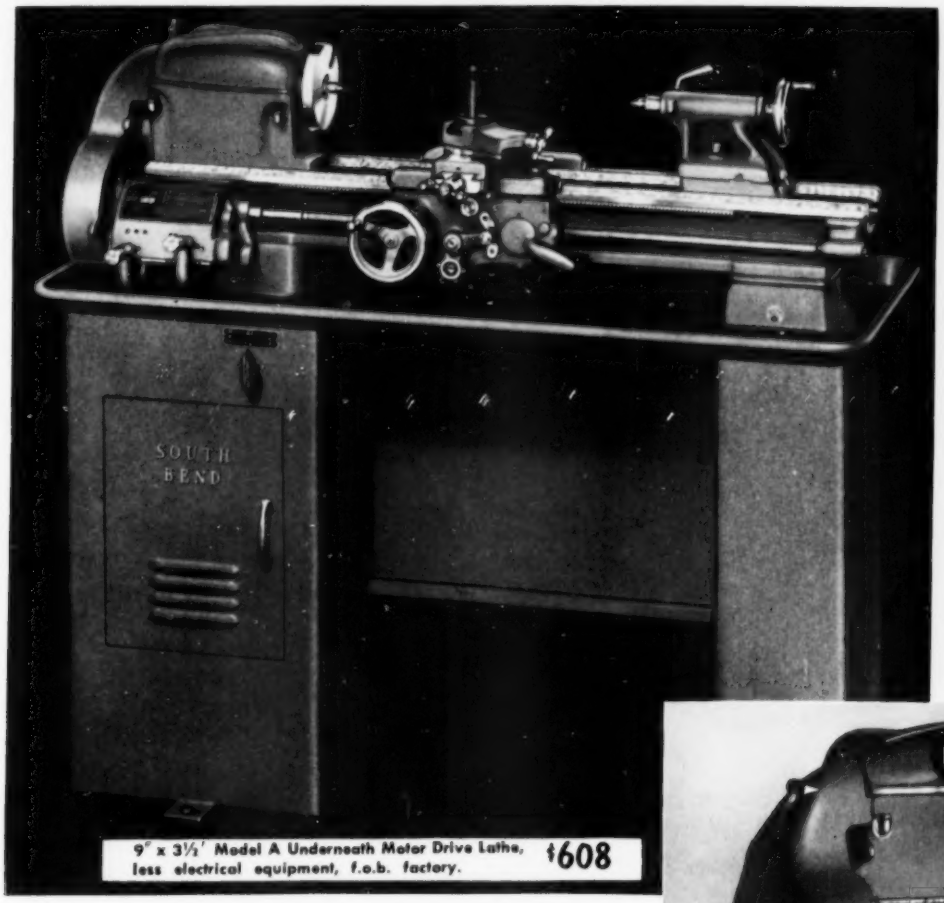

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This position of lever unlocks gear cover (A), headstock cover (B), and disengages motor drive (C) even if electric power is left on. Access is possible to gears (at A) or headstock belt drive (at B) only when these parts are not moving.

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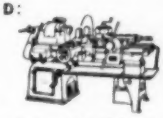
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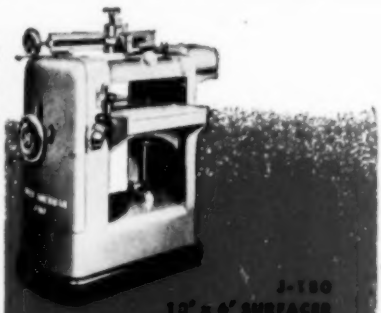

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MAY
1954

VOL. 43 NO. 5

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

Published on the 15th of the month preceding the date of issue by THE BRUCE PUBLISHING COMPANY, 400 North Broadway, Milwaukee 1, Wisconsin • CENTRAL OFFICE: 20 North Wacker Drive, Chicago 6, Illinois • EASTERN OFFICE: 225 Broadway, New York 7, New York.

★ ★ ★ ★

This Month's Cover

This month's cover shows an advanced mechanical drawing student in class at the High School at North Tonawanda, N. Y.

The work in this department includes sheet-metal layout and model making, and is under the direction of Frederick Neuschel, Jr.

Also shown are models made in the class. The picture was submitted by Mr. Neuschel.

★ ★ ★ ★

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ASSOCIATION NEWS

COMING CONVENTIONS

May 7–8. Wisconsin Association for Vocational and Adult Education, at Wausau Hotel, Wausau, Wis. Secretary, C. D. Rejahl, 211 N. Carroll, Madison, Wis.

May 31–June 5. Wyoming Vocational Agriculture Teachers Association, at University of Laramie, Laramie, Wyo. Secretary, Rex Tolman, Burlington, Wyo.

June 8–10. National Council of Technical Schools, at Conrad Hilton Hotel, Chicago, Ill. Secretary, Dr. J. B. Hershman, Valparaiso Technical Institute, Valparaiso, Ind.

June 10–11. Georgia Vocational Association, at Biltmore Hotel, Atlanta, Ga. Secretary, Miss Nancy White, Macon Vocational School, Macon, Ga.

June 15–18. Ohio Vocational Agriculture Association, at Ohio State University, Columbus, Ohio. Secretary, Jack Nowels, R.D. No. 1, Loudonville, Ohio.

June 15–18. Pennsylvania Vocational Association, at Eagles Mere, Pa. Secretary, Dr. Richard Hartmann, 3810 Walnut St., Philadelphia, Pa.

June 21–25. Colorado Vocational Association, at Colorado A. & M. College, Fort Collins, Colo. Secretary, Wm. E. Ratekin, 310 National Bank Bldg., Grand Junction, Colo.

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All shanks fit 1/4" chucks

Depth of cut: 5"

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AMERICAN INDUSTRIAL ARTS ASSOCIATION CONVENTION

Hotel Statler in Los Angeles, Calif., was the locale in which three memorable conventions associated with industrial arts were held during the week of March 23 to 27.

The members of the American Council of Industrial Arts Teachers Education, affiliate of American Industrial Arts Association, held their meetings on March 23 and 24, 1954. At the conclusion of their deliberations they elected Dr. John Whitesel, University of Oxford, as president, and Milo T. Oakland, State Teachers College, DeKalb, Ill., as executive secretary. The treasurer is Ivan Hostetler, University of North Carolina, Raleigh, N. C.

The American Council of Industrial Arts Supervisors also held its meetings on March 23 and 24. The officers for the coming year are: chairman — Douglas W. Gordon, Inspector of Industrial Arts, Toronto, Ont., Canada; and vice-president — Charles H. Dilks, Supervisor of Industrial Education, Wilmington, Del.

The official program of the fifteenth annual convention of the American Industrial Arts Association was opened by Dr. Fred J. Schmidt, Jr., head of the industrial-arts department, Ball State Teachers College, Muncie, Ind., and president of the American Industrial Arts Association, at the afternoon meeting on Wednesday, March 24.

He outlined that the association must strive to increase its membership, think about appointing a full-time secretary, and give greater aid in curriculum development and school shop planning.

Dr. John R. Ludington, specialist for industrial arts, U. S. Office of Education, in his address, stressed the problems that increased birth rate and the larger school population resulting therefrom present to our field. He emphasized that our attention must be given to recruitment of industrial-arts teachers, and that more and more teacher education institutions must devote some time to give industrial-arts training to all of their education students.

Dr. R. Lee Hornbake, industrial education department, University of Maryland, College Park, Md., pointed out that solutions to problems which confront mankind are usually developed by active minorities.

Industrial-arts education also is confronted by problems and we — the members of the industrial-arts teaching profession — must take the lead in solving them for our field.

Four discussion groups were then formed, each with a discussion leader and a recorder to discuss one of the following problems:

Group A — What are the improved curriculum procedures in industrial arts applicable at the local level?

Group B — How can the industrial-arts profession improve the development, selection, and use of instructional materials?

Group C — What are improved patterns of in-service education programs for industrial-arts teachers?

Group D — What teaching methods are appropriate to industrial-arts instruction and how do they apply to pupils of diverse capacities?

The members of these groups then met on Wednesday evening under their discussion leaders and laid out plans for the procedures to be followed at the morning and afternoon meetings on Thursday.

These group meetings were well attended and the problems carefully studied. The findings will be written up later and published. Those who were present at the meetings will also have an opportunity to review the findings before they are published.

On Thursday evening two convention meetings

(Continued on page 7A)

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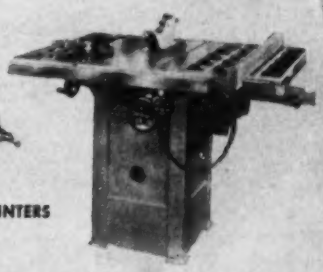

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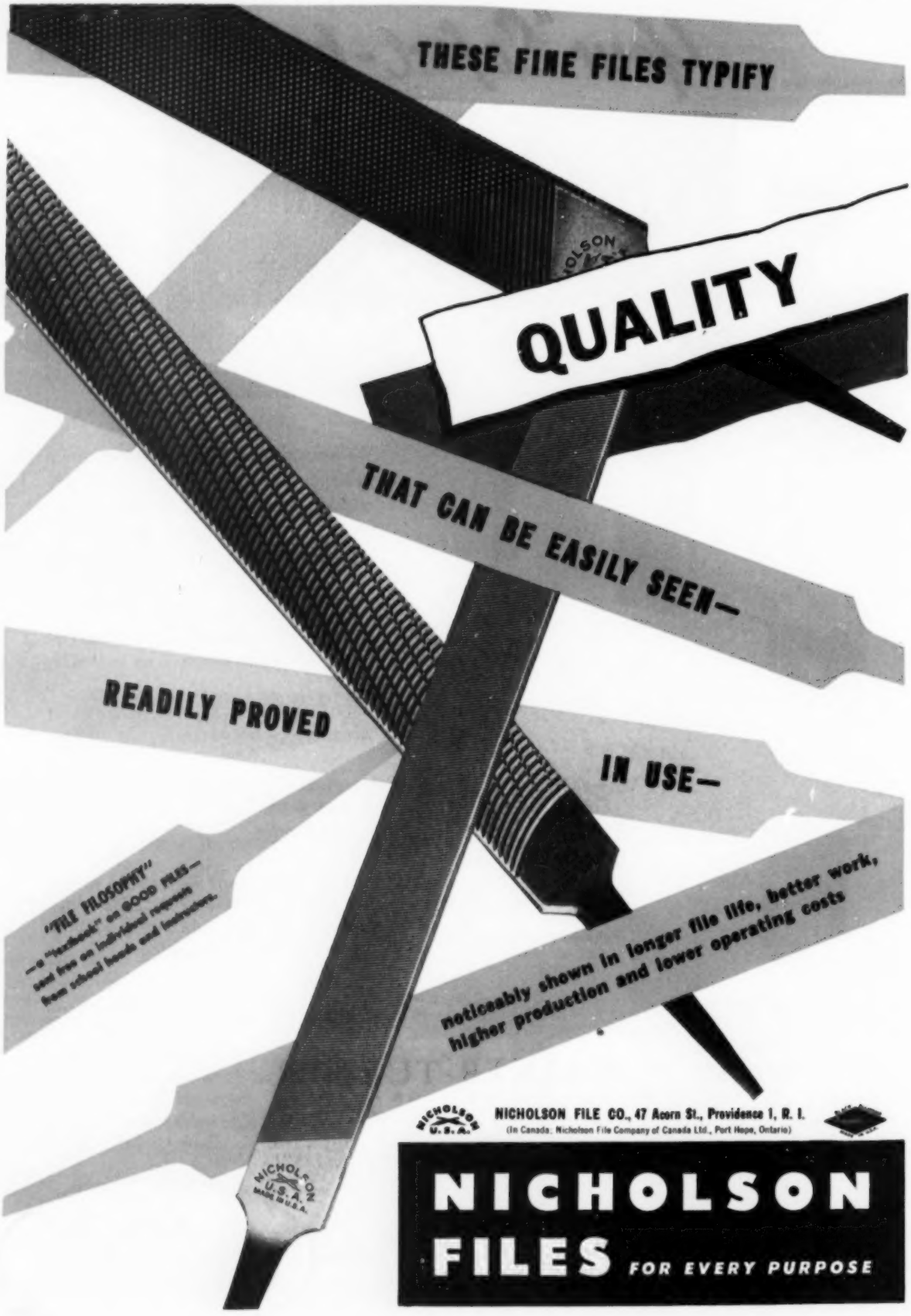
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FILES FOR EVERY PURPOSE

ASSOCIATION NEWS

(Continued from page 4A)

were held. In one "Modern Trends for Industrial-Arts Shops and Laboratories" was discussed, while in the other films of elementary industrial arts classes were shown.

Friday morning demonstrations on graphic arts enrichment, woodworking, electricity and radio, and the use of visual aids were given.

Dr. Heber Sotzin also gave an address on "Your Future," while Whitfield Kratzs spoke on "The Integration of Art and Industrial Arts."

At the business meeting held in the afternoon the following officers for the coming year were elected: president — Dr. Gerald Baysinger; vice-president — Dr. Burl N. Osburn.

J. Ely Van Hart, who had charge of the 1954 convention program and was exhibit chairman, and Kenneth W. Brown, executive secretary and treasurer of the association, will continue in the positions which they had filled so ably.

The "Industrial Arts Fair" which followed the business meeting, consisted of demonstrations in graphic arts, handcraft, yacht models, radio and TV, woodwork, drafting, auto mechanics, foundry, metalwork, electricity, and elementary industrial arts. Each of these demonstrations was repeated eight times so that the visitors could watch eight demonstrations each about ten minutes in length.

The annual banquet was held Friday evening. B. Gordon Funk, supervisor of senior high, vocational, and industrial arts, Los Angeles City Schools, acted as chairman.

The Ship's Party with its entertainment and distribution of prizes followed this banquet.

On Saturday the convention visitors went to Santa Barbara College, Santa Barbara, Calif., to help celebrate the silver anniversary of Epsilon Pi Tau.

The morning was spent in inspecting the college buildings. This was followed by a luncheon and a tree planting ceremony in honor of founding the Alpha-Beta Chapter of Epsilon Pi Tau in 1947.

Then followed the initiation. The new initiates are: Edward A. Bellezzo, George H. Allen, Alfred R. Bone, Jr., John Claude, Jackson B. Hargis, Robert W. Long, Robert E. Mullaney, Jess N. Walker, and Frank J. Ziol.

The 1954 convention at Los Angeles at the beautiful new Statler Hotel was really outstanding. In spite of the far distance some of the members had to travel, the attendance was good. The registration was approximately 1000.

The commercial exhibitors also were well represented, about 60 having taken space to show what they have for the shop teachers in materials, tools, and equipment.

The 1955 convention will be held in Atlantic City.

♦ The Northern Virginia Industrial Education Club held a dinner meeting on February 5, 1954 at Alexandria, Va.

Following the dinner H. F. Cooper of the U. S. Office of Education, spoke to the group on the relation of trade and industrial education to general education, discussing the objectives of each. He pointed out that one cannot replace the other, but that trade and industrial education should come at a terminal point in the education of youth.

After this talk J. F. Probst of the South Bend Lathe Works showed the group the mobile unit of South Bend equipment. Included in the exhibit was the new South Bend shaper and the new reduction in automatic power feed (.0007) for the South Bend lathes.

Then Dr. B. H. Van Ott spoke on "The Psychology of Teaching." He concluded his talk with the following observations:

1. We need to condition the boy to shop terms and procedures because the shop is an entirely different environment for him.

2. The boy has to learn new motor coordinations and will need considerable instruction, patience, and understanding.

3. The boy needs to think about what he is doing in order to develop skills.

A brief business session followed, after which the meeting was adjourned. — *Nelson W. Coe, Jr., Secretary.*

♦ Westmar College at Le Mars, Iowa, held its fifth annual Industrial-Arts Conference for Northwest Iowa on Saturday, March 6, 1954, with 54 teachers in attendance. The program was made up of the following.

1. Teaching of Auto Mechanics, by Richard Hammons, Le Mars, Iowa
2. Photography Simplified, by E. D. Crosby, Iowa State Teachers College, Cedar Falls, Iowa
3. Teaching of the Arts in O'Brien County, Iowa, by John B. Strack, Primghar, Iowa
4. Tools and Machinery, by R. W. Pitner, Sioux City, Iowa. — *Eldon Danne.*

♦ At the March 17, 1954, meeting of the Industrial Arts Association of Pennsylvania, held at the Castle Shannon Junior High School, Pittsburgh, Pa., the members furnished the host, Lloyd K. Lloyd, with 30 to 50 shop layouts which they had individually drawn on shop floor plans which he furnished to them. Lloyd is about to redesign his shop.

This is commendable co-operation which deserves imitation by other teacher organizations.

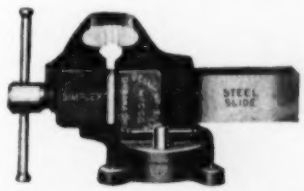
♦ The Executive Board of the North Carolina Industrial Arts Association have set the date and place for the Third Annual Project Fair.

This Fair will be held Saturday, May 1, 1954, in the Lindley High School, 2201 Spring Garden St., Greensboro, N. C.

The Fair will be run very much on the same order as the Ford Awards. It is hoped that many of the winning projects can be sent on to Dearborn to be judged in that contest.

(Continued on page 26A)

the complete line of quality vises for school shops



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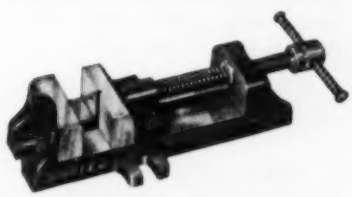

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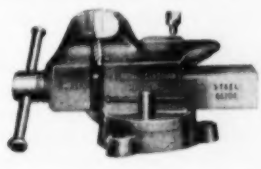

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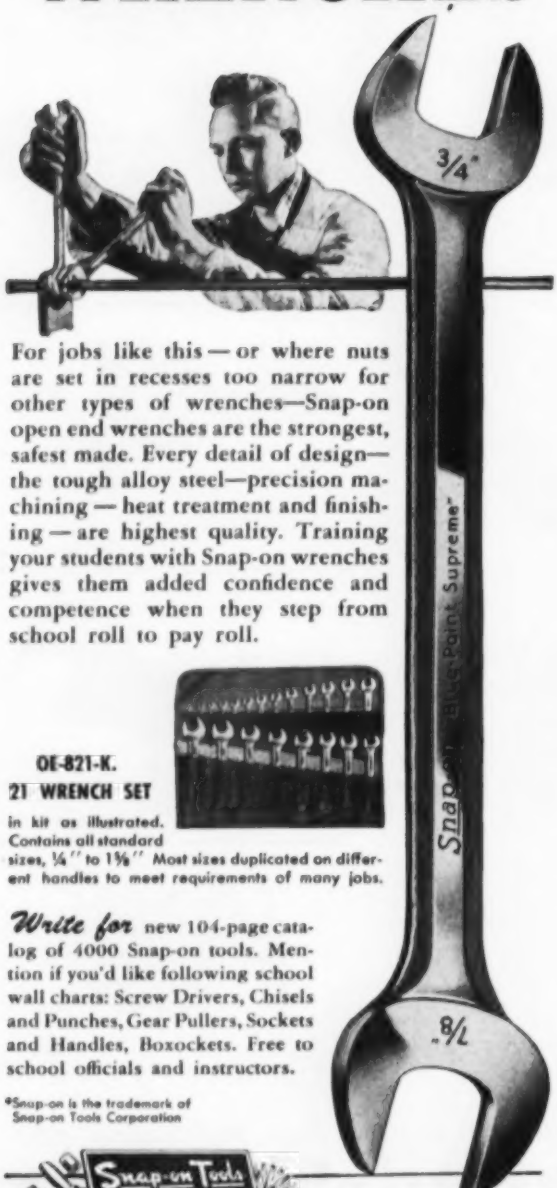

For jobs like this — or where nuts are set in recesses too narrow for other types of wrenches—Snap-on open end wrenches are the strongest, safest made. Every detail of design—the tough alloy steel—precision machining — heat treatment and finishing — are highest quality. Training your students with Snap-on wrenches gives them added confidence and competence when they step from school roll to pay roll.

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21 WRENCH SET
in kit as illustrated. Contains all standard sizes, ¼" to 1⅜" Most sizes duplicated on different handles to meet requirements of many jobs.

Write for new 104-page catalog of 4000 Snap-on tools. Mention if you'd like following school wall charts: Screw Drivers, Chisels and Punches, Gear Pullers, Sockets and Handles, Boxockets. Free to school officials and instructors.

*Snap-on is the trademark of Snap-on Tools Corporation

SNAP-ON TOOLS CORPORATION
8074-E 28th Ave., Kenosha, Wis.

"OLIVER"

Oilstone Tool Grinders

Show your students that good work calls for sharp tools

It's a simple matter for students to keep their plane bits, chisels, gouges, knives, etc., sharp on an "Oliver." Each of the two Tool Grinders shown has one coarse and one fine revolving oilstone, a dry emery wheel with tool rest and adjustable tilting tool rest table fitted with tool holder for parallel grinding. Sturdier lower machine also has an emery cone and leather stropping wheel.

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OLIVER MACHINERY COMPANY
Established 1890 GRAND RAPIDS 2, MICHIGAN

there's a **BIG** difference in the STRENGTH of

"C" Clamps

insist on genuine "Jorgensen"

"engineered" "C" CLAMPS
Strong expertly designed "JORGENSEN" Style No. 120 (above). Best value in "C" Clamps . . . ask your dealer. Style No. 1 "JORGENSEN" Carriage Clamp (right) give long service under hardest usage. Low in price.

insist on genuine "Pony" SMALL "C" CLAMPS

Will out-work, out-last ordinary "C" Clamps many times. Low priced. Many sizes and styles.

"Jorgensen"
BAR CLAMPS
fast-operating, many sizes

free catalog of Handscrews, Clamp Fixtures, Press Screws.

ADJUSTABLE CLAMP CO.
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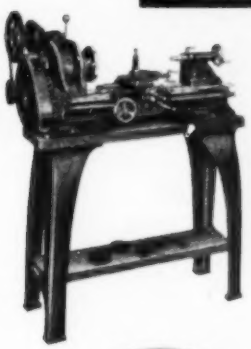
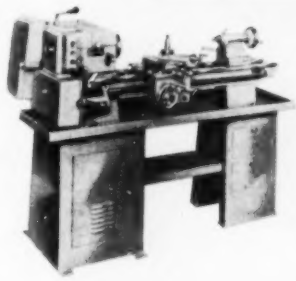
Atlas PRECISION TOOLS MEET SCHOOL NEEDS BEST!

10" LATHES



The only low-cost lathes with Timken tapered roller bearings; 16 spindle speeds; power cross and longitudinal feeds standard equipment. Greatest value by far for school shops.

NEW CLAUSING "5300" LATHES



New Clausing "5300" series 12" lathes offer more Plus Values for school shop work than have ever before been available in a 1" collet capacity lathe . . . at or near its price. "Zero-Precision" Timken tapered roller bearings. No. 3MT tailstock with tang socket. 12" swing over bed, 24"-36"-48" between centers.

Atlas Metalworking Tools

Atlas metalworking tools are today's best school shop buys! *They're priced as low or lower than any comparable on the market* — yet give you more outstanding precision features (many of them Atlas "exclusives") for a lifetime of *accurate, dependable shop service.*

You'll appreciate their extra-heavy, rugged construction, fine precision bearings, simplified operation, and exceptional versatility. Atlas tools help students learn quickly and get a broader understanding of the basic machining principles.

When you make up your equipment requisitions this year, keep *low-cost industrial quality* Atlas tools in mind. Send for the latest catalog.

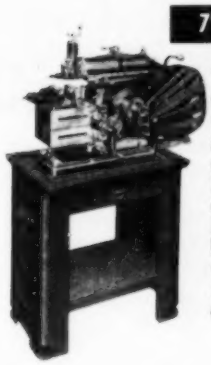
CLAUSING 18" DRILL PRESS

New, heavy-duty drill with many exclusive features for broad and thorough instruction. Drills to center of 18¼" circle. Capacity, ¾" in steel, 1" in cast iron — 6½" spindle travel.

DRILL PRESSES

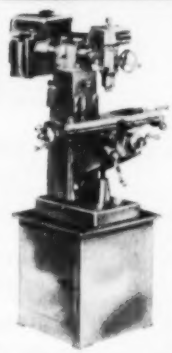
15" floor and bench models include new operating and durability features. 4 ball bearing "floating drive" for long accuracy life. Extra-heavy head, table, column, base. New depth control stop. 12¾" bench size also available.

7" SHAPERS



The only compact shapers with all the sturdy construction and operating features of large shapers, built down to size. Timken tapered roller bearings. Crank type ram drive. 4 speeds, 5 automatic cross feeds.

NEW CLAUSING VERTICAL MILLER



Mills, drills, bores, reams and shapes — at all angles—with one work setup! 6" x 24" table, high precision spindle head, 3" quill travel, six speeds — 180 to 3250 R.P.M. Ideal for school shop instruction.

ATLAS PRESS COMPANY

506 N. PITCHER STREET • KALAMAZOO, MICHIGAN

Atlas DEPENDABLE QUALITY TOOLS SINCE 1911

This Duro Woodworking Lathe Has

Exclusive Features

not found in any other lathe!

has 10"x16" table slotted for Sanding Attachment — mitre gauge. Includes 10" disc.

Hand wheels lock the tailstock and tool rest to the bed and give greater capacity over the tool rest holder.

Students and teachers will appreciate the many extra features incorporated in this new Duro 14" x 38" production lathe. Designed to provide maximum versatility, safety and easier operation, it will easily take a 14" swing over the center bed — and the 38" distance between centers permits work on large projects without sacrificing accuracy. Has heavy bed with precision "V" and flat ways to assure positive alignment of head and tailstock; head and tailstock spindles are machined for No. 2 Morse taper centers and adapters; ball bearing equipped; 4 step headstock pulley is guarded and has convenient indexing device; has speed range of 850–3450 R.P.M. (with 1725 R.P.M. motor). These are only a few of the many operating advantages.

WRITE FOR FULL DETAILS

Send for free circular on this new Duro Lathe. Also get the new 1954 Duro Power Tool Catalog.

Duro Metal Products Co.
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CHICAGO 39, ILLINOIS

Duro Metal Products Co.
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Gentlemen:

Please send circular on your Lathe for school shops. ☐ Send me your 1954 Power Tool Catalog.

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HIZ MAJIZTY

MUST HAVE THE BEST

Because the future is his domain we must give his present endeavor firm support. At the Sjöström work bench he will be inspired, because *it is*, in itself, a lesson in craftsmanship.

V 6-D

Elementary bench 42" long x 22" wide x 26" high. There are others. Ask for data sheet C-532

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Choose PROTO for your other plier needs. The complete line has the right plier for almost every job.

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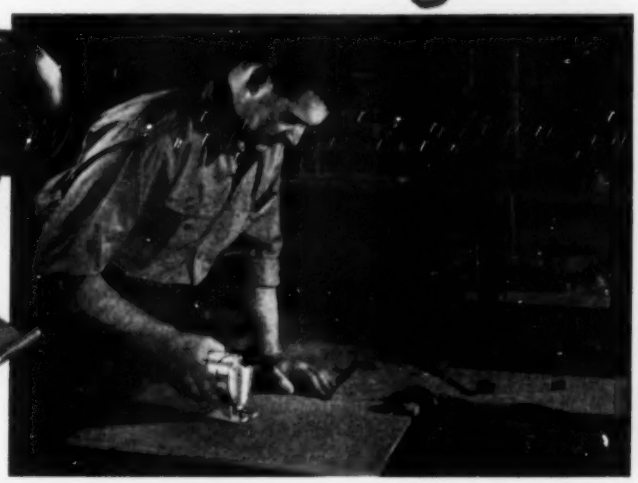
NEW! B&D UTILITY Portable Jig Saw

Perfect for cutting wood, plastic, metal, leather, rubber and composition materials; cuts straight lines as well as intricate patterns. Powered by a specially-built B&D universal motor. Complete with 5 different blades, to cut most every kind of material . . . . . *only* **$49.50**



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All-around drill for wood, metal, plastics. Capacity: ¼" in steel; double in hardwood. Compact, light, powerful – *only* **$22.95**

B&D UTILITY 5" Sander-Polisher

Equipped for drilling wood, plastics, and metal . . . for sanding and polishing furniture, woodwork projects, etc. . . . . *only* **$32.95**

B&D UTILITY ½" DRILL

For all-purpose drilling in all kinds of materials. Greater strength and capacity (½" in steel; 1" in hardwood) than ¼" drill. . . . . *only* **$44.95**

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Newly improved. Designed with Easy-grip handle, safety-lift guard. Other features: 4 models; 6, 7, 8 and 9-inch blade diameters. Priced from **$64.50**

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Switch to Black & Decker Utility Tools—*the quality line at a reasonable price!*

EVEN if you're working on a tight budget, you can still teach your students the *right* way with tools made by Black & Decker, world's largest manufacturer of portable electric tools. Every B&D Utility tool is well-made, dependable, and handles easily like the professional Black & Decker tools your students will use in industry. Famous Black & Decker safety devices cut down beginner nervousness. What's more, a complete line of accessories increases the versatility and value of these tools. Give your students this extra break—train them on Black & Decker-built tools!

Remember—*B&D Utility Tools cost you less in the long run, because they give longer life.* See your nearby B&D Utility Dealer for complete information, or write for catalog to: THE BLACK & DECKER MFG. CO., Dept. 616, Towson 4, Md.

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PORTABLE ELECTRIC TOOLS

Train Your Students Today On The Same Lathes They will Use In Industry Tomorrow!

Introducing the NEW model SS 15

SPIN MASTER®

metal spinning lathe

. . . a 15-inch precision lathe especially designed for the spinning of standard gauge metals featuring . . .

5 important, exclusive advantages:

MODEL SS 15 SPIN MASTER® INCLUDES:

- ¾ h.p. Motor (220/440 V., 60 cycles, 3 phase)
- #0 Ball-Bearing Center
- 6-Inch Face Plate
- Fulcrum Pins
- Set of 5 Spinning Tools with handles
- Tail Stock and Rest Bank Wrench

FOR COMPLETE SPECIFICATIONS WRITE FOR NEW ILLUSTRATED BROCHURE ON YOUR SCHOOL LETTERHEAD

① VARIABLE SPEED CONTROL. Spin Master® SS 15 provides a completely variable speed range from 480 to 2750 r.p.m. with selection of infinite graduations. Instantaneous speed adjustment permits changing of speeds while machine is in operation. Starting and stopping of machine at any given speed may be done without the necessity of going through the entire speed range.

② BALL-BEARING SPINDLE, 1½" - 8 Thread. Affords greater versatility because it has the same thread dimension used on most standard school shop engine lathes. Spinning forms may be transferred directly from the engine lathe to the Spin Master® SS 15 without the need of special adapters.

③ GREATER SIMPLICITY OF DESIGN. Offers unusual ease of operation. Students learn easier and faster on Spin Master® SS 15 because there are no tricky "gadgets" to distract them or to get out of order.

④ EXTRA RUGGED CONSTRUCTION. The Spin Master® SS 15 is constructed exactly like our industrial metal spinning lathes with sturdy, massive headstock; tailstock with large heavy-duty spindle; and the rest bank on a lock-in sole plate. These features mean longer life and smooth, vibrationless operation.

⑤ UTMOST SAFETY. A start-and-stop switch bar which may be operated from any position in front of Spin Master® SS 15 is provided.

HAAG MACHINE COMPANY INC.

224 WARBURTON AVENUE, HAWTHORNE, N. J.

Your Students Will Learn *FASTER* on a PARKS PLANER

The PARKS No. 20
20" PLANER

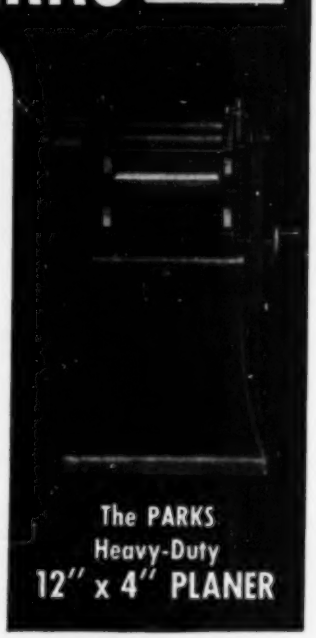
Students advance quickly on Parks Planers because they find them easy to operate, safe, and accurate. And, since both the Parks 12" and Parks 20" Planers have been designed and precision-built for accuracy and high-speed line production in industry, they are ideally suited for the school shop because they give practical experience on the type of machines your students will eventually use. Both machines are priced low enough for even the most modest shop budget.

The Parks No. 20. 20" Planer has a 4-knife cutterhead with a speed of 3600 R. P. M. and offers two feed speeds—20 and 40 F. P. M., and 40 and 80 F. P. M. Will take work up to 20" wide by 6" thick. Ruggedly built for vibrationless operation.

The Parks Heavy-Duty 12" x 4" Planer. A compact, sturdy thickness planer that offers mill planer precision at low price. Has feed speed of 16 F. P. M. at 4000 R. P. M. Will handle material as short as 6" and as thin as 1/16".

Write for complete descriptive literature.

Manufacturers of Quality Woodworking Machines since 1887.



The PARKS
Heavy-Duty
12" x 4" PLANER

The PARKS WOODWORKING MACHINE CO., Dept. 24-B17, 1546 Knowlton St., Cincinnati 23, Ohio

GRINDERS by BOYAR-SCHULTZ

No. 2 PROFILE GRINDER

For grinding and fitting odd shapes and irregular contours such as the type found in air craft, automotive, locomotive and other heavy work. Made in two styles—Single or Dual Spindle. Spindles turn at 10,000 R.P.M. Wheel sizes, ½" to 3" diameter.

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A bench type Grinder for saving time grinding odd and irregularly shaped surfaces; fitting dies and punches. Spindle turns at 20,000 R.P.M.

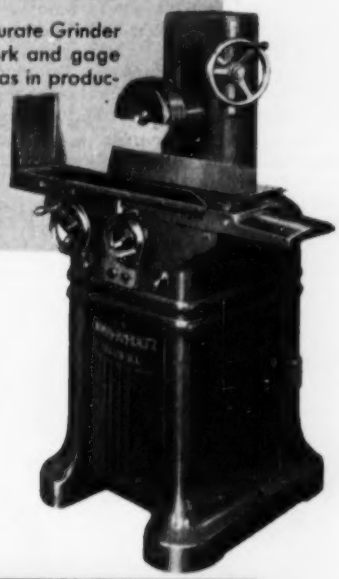
No. 6-12 SURFACE GRINDER

A precision Tool providing close tolerance performance associated only with larger and more costly grinders. It produces flatness, horizontal and vertical accuracy comparable with larger, more costly Grinders.

Self contained Dust Collector Unit furnished as optional equipment is built into a streamlined stand replacing the one regularly furnished. No additional floor space required.

6-18 SURFACE GRINDER

An extremely accurate Grinder for tool room work and gage grinding as well as in production. Rugged construction and superior design assure accuracy over a long time.



BOYAR-SCHULTZ GRINDERS IN THE TOOL ROOM AND DIE SHOP . . . have won a most enviable reputation for accuracy where accuracy counts most. They are dependable . . . the favorite machine tools with skilled mechanics who KNOW how a fine tool must perform.

BOYAR-SCHULTZ CORPORATION

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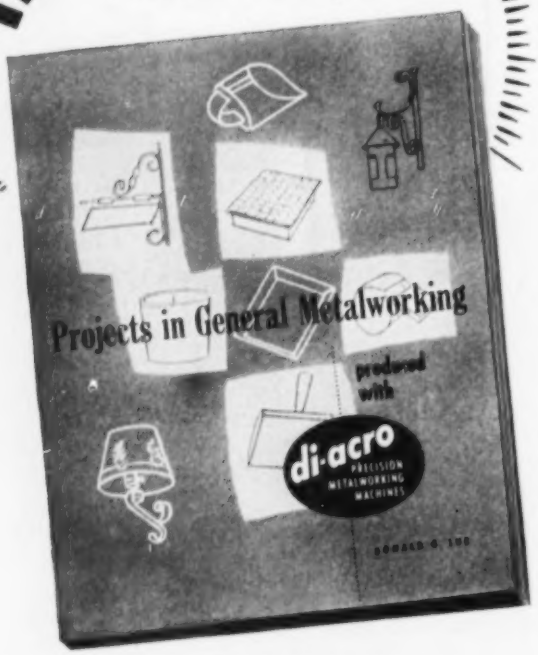
IDEA BOOK
for the Metalworking Instructor



32 PAGES of "How-To-Do-It" data

A copy of "*Projects in General Metalworking*" by Donald G. Lux, University instructor, is yours for the asking. Common metalworking projects, easily made with Di-Acro Machines, are clearly illustrated. Techniques are described such as bending scroll shapes, setting down a hem, and box and circle forming. Step by step procedure for making metal items like a pin-up lamp, kitchen scoop, nameplate bracket, waste basket and dustpan are easy to follow.

Simply make a request on your school letterhead and a copy of this valuable booklet will be mailed you promptly, and without charge. Classroom quantities are also available at 25c each.

Di-Acro Rollers, Brakes, Benders and other bench machines are ideal for the school shop. Complete specifications and costs are included with the booklet. *Write today for your free copy!*

DI-ACRO BENDER NO. 1

DI-ACRO is pronounced Die-ack-ro—the brand name for more than 40 hand and power operated precision cutting, punching and forming machines.

DI-ACRO FINGER BRAKE

DI-ACRO ROLLER

di-acro PRECISION METALWORKING MACHINES

O'NEIL-IRWIN MFG. CO.
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adjustable Elementary Bench

No. 42-21
Elementary Bench

Send for School Catalog

Here's the answer to changing height requirements! Adjustable steel legs permit adjustment to 24", 26", 28", and 30" . . . and only one bolt need be adjusted for each leg!

Smooth 1¾" laminated maple top is 42" long, 21" deep, and is equipped with one Elementary Woodworkers' Vise. Bench can be furnished with or without lower shelf of steel.

Also available 48" x 27" with two vises. Send for complete information TODAY!

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"The Tool Holder People"
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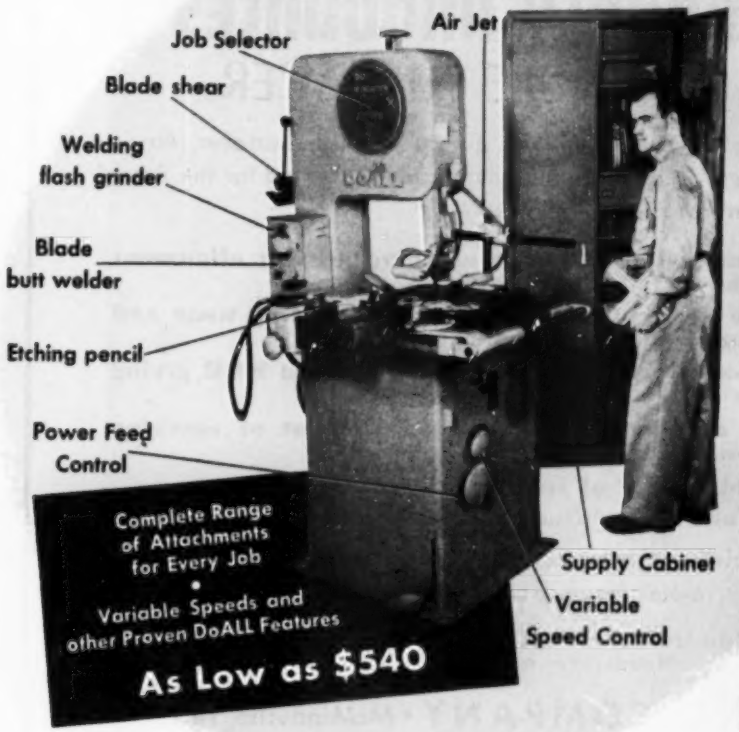
DoALL *Announces* A NEW LOW COST 16" CONTOUR MACHINE

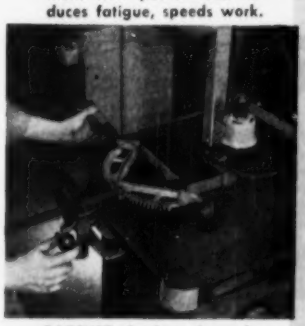


NEW carbide tool finishing attachment with abrasive bands!

TILTING table plus mitering attachment produces compound angles.

HEAVY work slide attachment with power feed reduces fatigue, speeds work.

CUT-OFF and mitering attachment provides precision accuracy, speed.



RATCHET feed and work-holding jaw for ease and speed.

DISC cutting attachment produces perfect circles fast and easily.

RIP fence makes fast, precision cutting a simple job.

FILING—internal or external with DoALL file bands.

Now Any Plant Can Afford The Advantages of a DoALL!

HERE IS the greatest value ever offered in a 16" x 12" capacity multi-purpose contour saw: for toolroom and light production work . . . automatic power feed . . . fixed and variable speeds of 50 to 5200 blade feet per minute . . . for sawing, friction sawing, filing, polishing, carbide tool finishing.

There are five models, starting at $540 (less motor, starter and attachments). *You save money* because you do not have to buy more machine than is needed for the job. *You get more for your money* because these machines have DoALL quality and DoALL versatility through and through.

And, never before have machines in this size and price class been available with such a great variety of attachments. There is no class of work within their range which cannot be handled faster and at lower cost with these new DoALL's.

Ask for a demonstration in your own plant. Call your local DoALL Service-Store, or write:

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DoALL

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DoALL SAW BANDS
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DoALL BAND TOOL MANUAL

160 pages of data on selection and use of saw bands, file bands, other band tools for band machining all materials. Terms, definitions, selection tables, diagrams, problems and answers. Price $2.00.

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Realizing the ever increasing demand for a low priced, heavy duty 12" single surfacer, Powermatic takes pleasure in introducing a completely NEW 12" x 5" planer ideally suited for the School and Vocational arts shops. Outstanding features are as follows:

- **One piece cast iron frame assuring perfect alignment at all times.**
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- **3 knife safety type cutterhead turns 4400 RPM giving 73 knife cuts per inch.**
- **Positive action clutch mounted on front of machine convenient to operator.**
- **Completely guarded for safe operation.**
- **Modern and streamlined in design.**

PRICED: Complete with steel floor stand, belt guards, cutterhead pulley, motor base, less motor.....$249.50

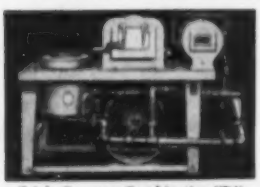
Also Manufacturers of 16", 20", 24" Planers, Mortisers and Tenoners.

POWERMATIC MACHINE COMPANY • McMinnville, Tennessee

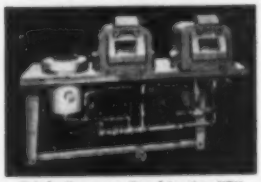
Sunbeam STEWART

THE BEST INDUSTRIAL FURNACES MADE

THOUSANDS OF THESE SUNBEAM STEWART FURNACES ARE IN THE VOCATIONAL DEPARTMENTS OF TECHNICAL SCHOOLS



Triple Purpose Combination "D"



Triple Purpose Combination "E"

Because Sunbeam Stewart units have been designed for efficient production heat treating in small shops and tool rooms, they are widely recognized as standard equipment for all types of industrial heat treating and vocational training work. To provide complete heat treating facilities for training purposes Sunbeam Stewart especially designed combination units, shown at left.

For student instruction and reference, write for free "Guide to Furnace Selection." Aids in determining the type of furnace best suited for any work. Also ask for Data File on school units.

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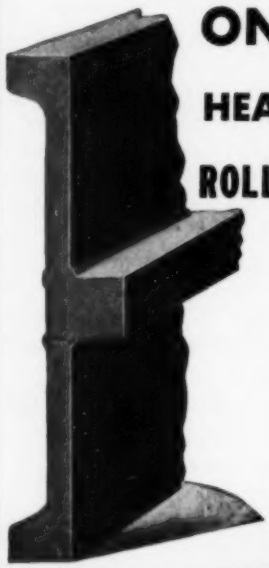

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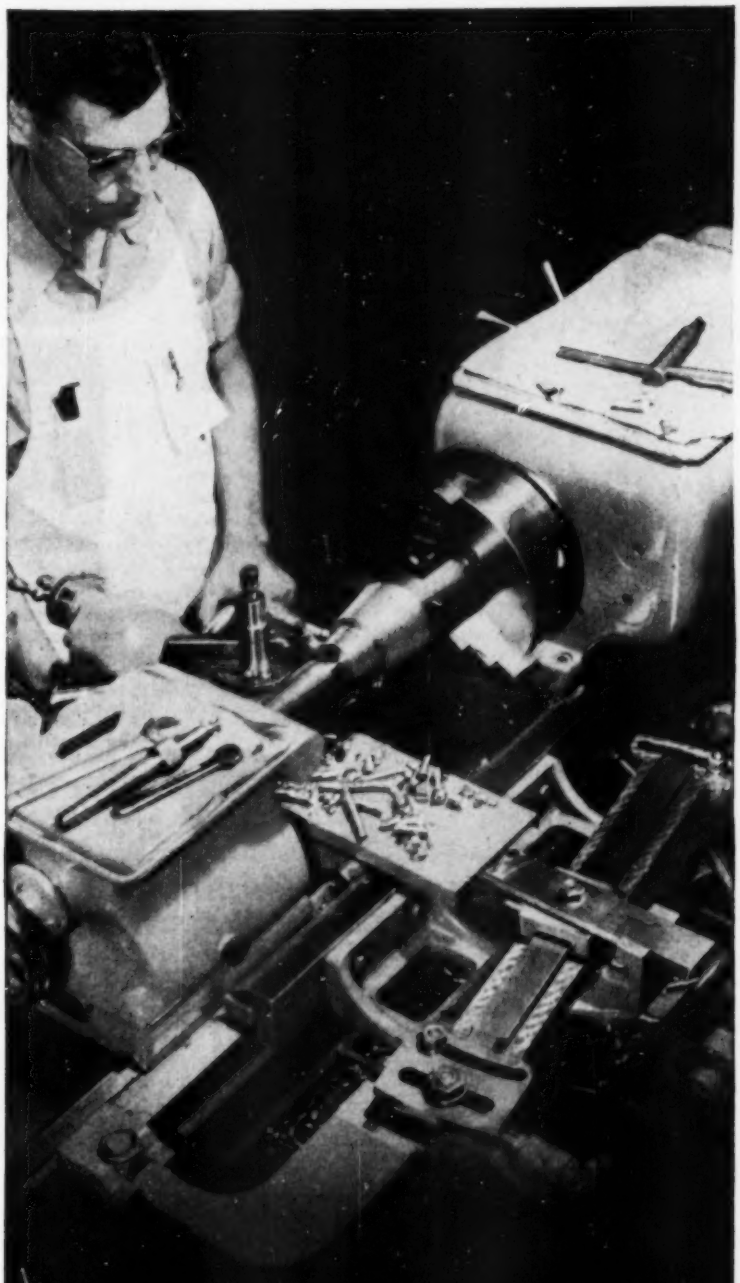
Gives You
HEAVY-DUTY FLASKS
Engineered from
ROLLED STEEL CHANNEL

Almost a half century of "Know-How" assures precision-built steel flasks fabricated to highest quality Standards. Sterling Flasks have these patented, life-prolonging features: **all-steel welded construction . . . solid reinforcing bars . . . heavy rolled steel flanges . . . square corners . . . full-width bearing.** Available in a variety of styles and shapes. Write for catalog.

STERLING WHEELBARROW CO.
Milwaukee 14, Wis., U. S. A.



train them on the tools industry uses...

CINCINNATI

LATHES and DRILLS

Will ±.0002" make him wince?

Right from the first day on the job, shop people can tell what kind of school the "new man" came from. Industry likes them when they can look at a print and not wince at ±.0002". It likes them when they can break in smoothly on the tools of production . . . knowing from background about such things as high speeds, direct-reading shifting and precision spindles.

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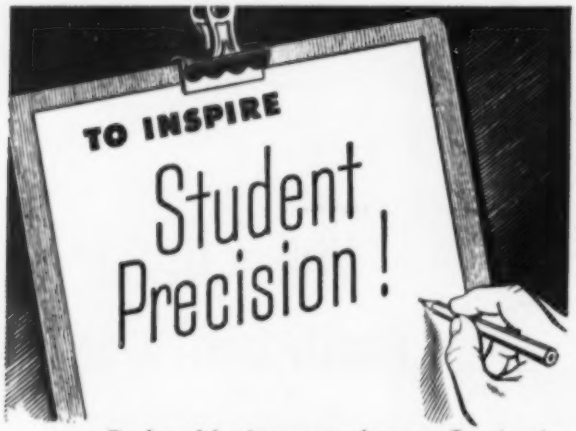
For amazingly small investments, your shop can be equipped with production tools . . . Cincinnati Lathes and Drills. The difference is something your students will measure in their pay checks tomorrow.

Today... write, on your school letterhead, for catalogs, prices and the name of your local Cincinnati Lathe dealer. Cincinnati Lathe & Tool Co., 3213 Disney, Cincinnati 9, Ohio.



Preferred by instructors because they inspire students to new achievements . . . WESTON instruments also are the choice of practical administrators because their ruggedness and year after year dependability make their cost remarkably low! Ask for bulletin listing all instruments.

WESTON Electrical Instrument Corporation,
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For Advanced Requirements MODEL 622

Ultra sensitive instruments of the double pivoted type requiring no leveling when used in horizontal position. Combine high accuracy and a 6.1 inch scale . . . ideal for precise measurements of potential and current at very low energy levels. Available as d-c voltmeters, millivoltmeters, milliammeters and microammeters; electrolysis volt-millivoltmeters and high resistance voltmeters—also as a-c rectifier type instruments and as thermocouple ammeters, milliammeters and voltmeters.

For Electrical Machinery Labs MODEL 633

A clamp-on volt-ammeter built to Weston standards of safety, accuracy and dependability. Five full scale a-c current ranges of 1000/250/100/25/10 amperes with range overlap. Three self-contained a-c voltage ranges of 700/350/175 volts—insulated for 750 volts. Has convenient 6 position switch easily operated by thumb—adjustable pointer stop facilitates measuring starting current of motors.

WESTON Instruments

Students learn easier, work more safely and more accurately when their eyeglasses are SIGHT SAVER clean. Install SIGHT SAVER Cleaning Stations in your shop. Promote safety, reduce waste by making it easy for students to keep eyeglasses clean. Low cost Sight Saver Cleaning Stations are easy to install—dispense one 3" x 7" tissue at a time. Each tissue is scientifically treated with SILICONES. Thousands of industrial plants and millions of people use Sight Savers to clean, polish and protect glass lenses.

*Available** from
leading Safety Supply Houses

Cat. No. 80 Black Dispenser – $2.50
Cat. No. 81 White Dispenser – $2.50
Cat. No. 82 Green Dispenser – $2.50
Cat. No. 83 Refill Packet
contains 800 tissues – $1.45

* Write Dept. BX17 for name of Safety Supply Houses in your area

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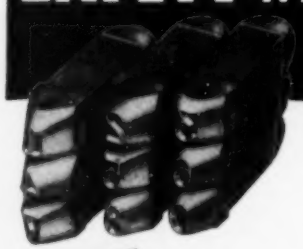
Midland Michigan

WANT MORE EFFICIENT— LONGER LASTING STEEL STAMPS?

USE "SAFETY" WEDGE GRIP LETTERS and FIGURES



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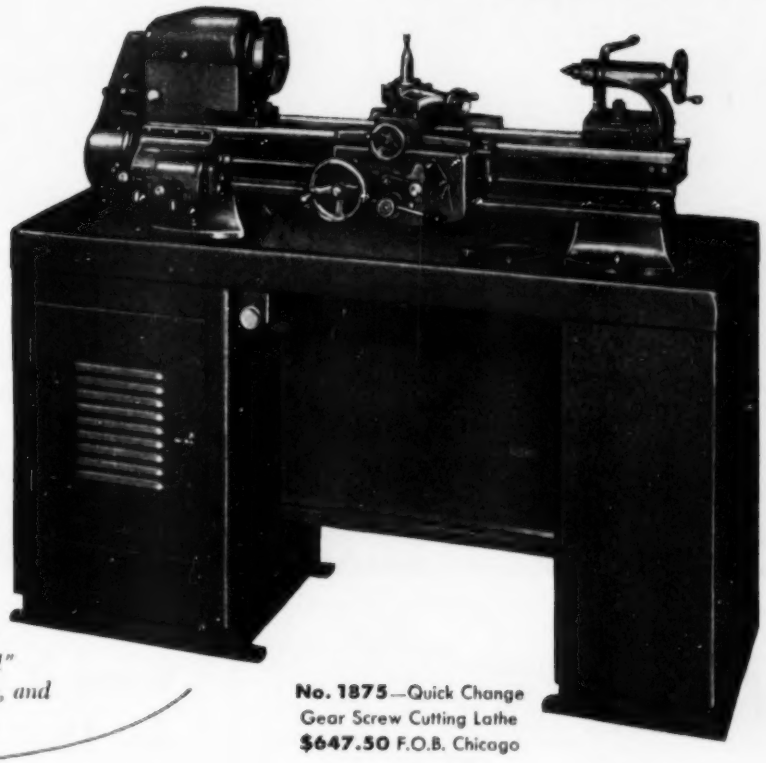
Knurled sides for positive grip—patented design provides perfect balance and deeper impressions. Especially recommended for toughest jobs on steel castings, cylinders, tool steel, etc. All sizes available 1/16" to 1" characters. Write for Bulletin LF-50 and for Special Literature on Marking—for use in Industrial Arts Instruction.

Mecco SAFETY MARKING TOOLS M.E.CUNNINGHAM CO.

1037 CHATEAU STREET, PITTSBURGH 33, PA.

THIS Logan 10" SWING * LATHE

TRAINS THE STUDENT ON A STANDARD INDUSTRIAL TOOL



* *One of the many in the complete Logan line of 9", 10", 11" and 12" swing Lathes, and 8" Shapers.*

No. 1875—Quick Change Gear Screw Cutting Lathe
$647.50 F.O.B. Chicago

Brief Facts

Swing over bed, 10½"
Center Distance, 24"
Bed Width, 6 15/16"
Ball Bearing Spindle
Spindle Hole, 25/32"
16 Spindle Speeds, 38 to 1230 rpm
Double V-belt Drive for extra power to spindle is completely enclosed
Threads—46 selections, RH or LH—4 to 216 per inch

The No. 1875 equips the metalworking teacher to train the student on one of American industry's standard machine tools. This trim, compact, 10" swing Logan Lathe is built with advanced design features and to precision standards outstanding in its field. Its spindle turns on pre-loaded *ball* bearings of extreme precision, so adaptable to all speeds they need no adjustment in the full range of 38 to 1230 rpm. The automatic apron, double-walled and friction-free, with spline driven power cross feed, has a convenient, lever-operated disc-type clutch. The two V-ways and two flat ways of the heavy-ribbed, special alloy bed are precision ground to within .0005" of perfect alignment. At vital wear points self-lubricating bronze bearings minimize friction and sustain accuracy.

For the student's safety, V-belt drive, headstock, countershaft and motor are enclosed. Controls and switches are easily accessible. The compact, space saving design is ideal for multiple installations. The low price results from the major savings of finer tooling and efficient operation in the modern Logan Plant.

Write for the Logan Lathe Catalog

Logan ENGINEERING CO.
Lawrence and Lamon Avenues, Chicago 30, Illinois

LOOK TO Logan FOR BETTER LATHES AND SHAPERS

Visualized Lessons FOR YOUR SHOP PROGRAM

These large lighted pictures provide visualized lessons. They show tools and machines in detail; they demonstrate correct use; they emphasize safety.

All this helps you explain everything to your entire class more effectively — 16,118 pictures any size you like.

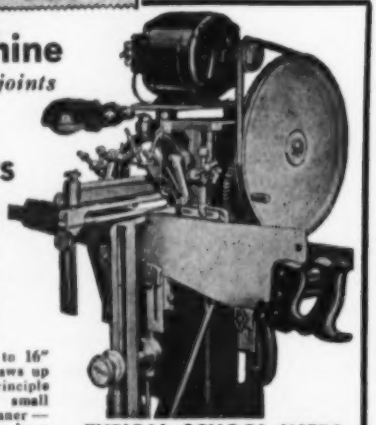
Write for literature describing slidefilms for your shop.

The JAM HANDY Organization

2821 E. GRAND BOULEVARD • DETROIT 11 • MICHIGAN

SAW FILING

This ONE Machine
automatically files and joints
HAND, BAND, CIRCULAR Saws



The Foley Saw Filer is ideal for sharpening saws used by students in school shops. It keeps them in tip-top shape, faster and better than by hand filing. Used by Army, Navy, hundreds of manual training departments and industrial plants. The Foley is the only machine that files and joints all hand, back and mitre box saws from 3 to 16 points per inch, crosscut circular saws up to 16" diameter (24" optional), and band saws up to 24" long. Patented jointing principle automatically evens up large and small teeth, so saws cut faster, truer, cleaner — stay sharp longer. Foley filed saws have less breakage and last longer.

30-DAY TRIAL OFFER

You may have the privilege of using the Foley Saw Filer in your own shop for 30 days. Write or send coupon for details and list of school users.

TYPICAL SCHOOL USERS

Berea College, Berea, Ky.; Board of Education, Cleveland, Ohio; Boys Technical H. S., Milwaukee, Wis.; Charleroi School District, Charleroi, Pa.; Redlands Public Schools, Redlands, Calif.; Stout Institute, Menomonie, Wis.

FOLEY *Automatic* **SAW FILER**

FOLEY MFG. CO., 3318 N.E. 5th St., Minneapolis 18, Minn.
Please send full information on 30-Day Trial Offer and list of school users of Foley Saw Filers.

Name.....

Address.....

School.....

Keep Your Brushes Ready for Use With This NEW PROTEXEM

Paint Brush Conditioner Designed for Shop Use

This new rectangular PROTEXEM Paint Brush Conditioner gives you room for more brushes, is handier and its sturdy metal construction assures many years of service. The round PROTEXEM UNIT has been used in schools for over 10 years. This new rectangular unit is designed for greater use and life.

The PROTEXEM Brush Conditioner makes use of VAPOR ACTION to soften hard as rock brushes and keep paint brushes soft and always ready for use. No more messy cleaning jobs. You can put your brushes away at the end of the day and they are ready for use the next morning when you store them in a PROTEXEM Paint Brush Conditioner. FULLY GUARANTEED.

Write for Information and Special School Price

WISCONSIN LABORATORIES, Inc.

Dousman, Wisconsin

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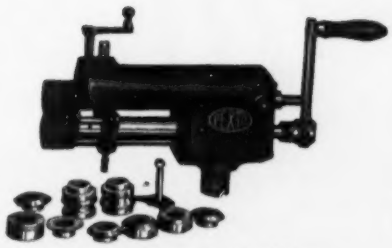
PEXTO

OLDEST NAME IN THE INDUSTRY

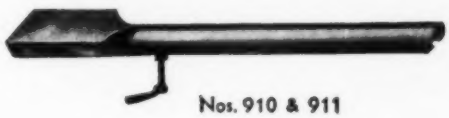
From the trade schools, where students qualify as Sheet Metal Workers, to industry's leading shops, you'll see a preference for Machines and Tools of PEXTO manufacture.

Year in, year out, this favored equipment serves for every essential operation, in a wide range of capacities and types.

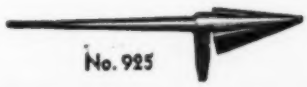
Illustrated are a few of the sheet metal working machines manufactured by PEXTO.



Combination Rotary Machines



Nos. 910 & 911



No. 925

No. 935

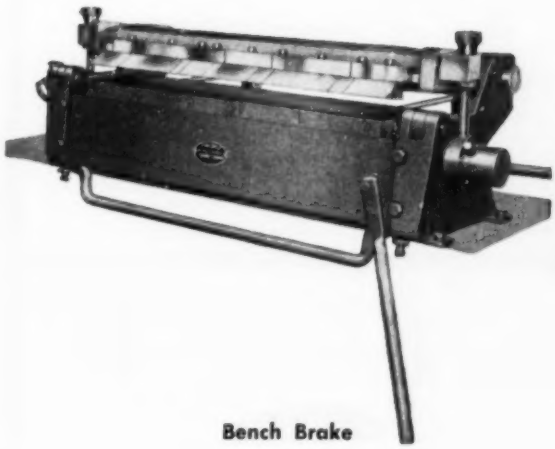
No. 901

No. 943

Stakes

Forming Machines

Bar Folders



Bench Brake

Rotary Machines

Squaring Shears

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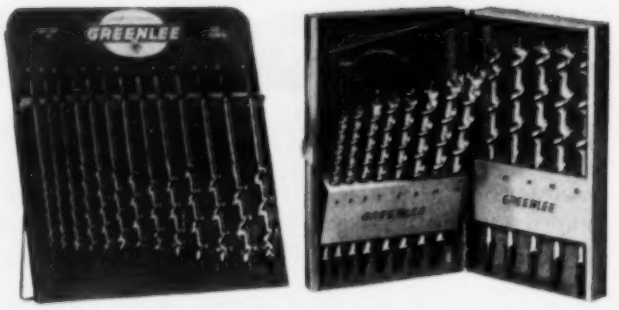
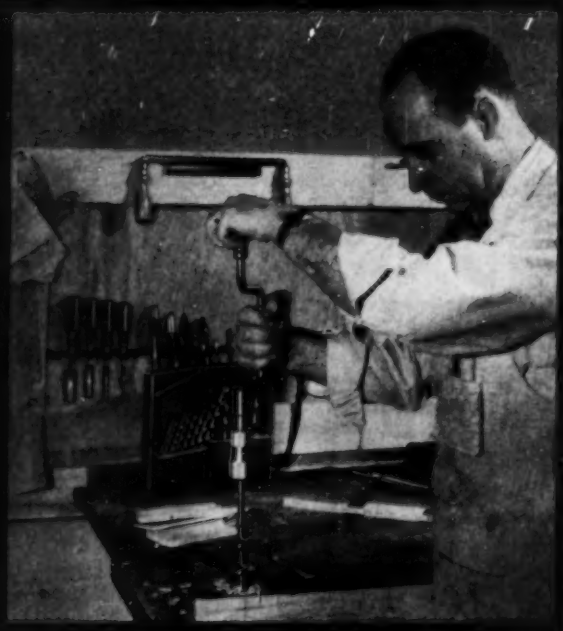
GREENLEE 22 SOLID-CENTER AUGER BITS

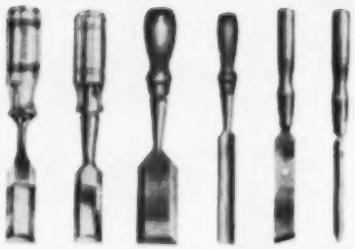
Made with utmost care to assure free, easy boring and fast chip clearance. Solid-center design for extra strength, smooth operation. Accurately sized, perfect cutting edges. "Plastic-Sealed" to reach you factory-sharp. Can be purchased singly or in handy bench sets and steel boxes as shown at right (also in plastic rolls).



Better Shopwork with fine hand tools by GREENLEE

Good workmanship comes easily with GREENLEE tools. All are carefully formed and finished for accuracy and correct cutting edges and are properly heat-treated for long life. They are made by craftsmen for craftsmen.



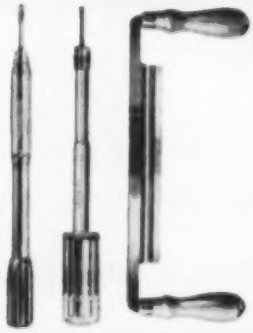


CHISELS, GOUGES, TURNING TOOLS

Various types of tang butt, socket butt and firmer chisels with durable green plastic or hickory handles. Outside and inside bevel socket gouges. Short and full-length turning tools.

EXPANSIVE BITS, DRILLS, ELECTRIC-DRILL BITS

Fast, easy-boring expansive bits with positive chip clearance. Two styles: Setfast with quick adjusting-locking feature, and Plain type. Wood-boring brace drills and solid-center electric-drill bits in various sizes.



SPIRAL SCREW DRIVERS, PUSH DRILLS, DRAWKNIVES

Free-running, fast action GREENLEE spiral screw drivers are available in two models: Enclosed Spiral for extra safety and grit-free operation, and Open Spiral. Automatic push drills are smooth operating with automatic spring return . . . handle holds eight drill points. GREENLEE drawknives are light in weight and have sturdy, rigid blades for accurate work.

The GREENLEE line also includes many other time-saving tools for students and shop workers: Bit Extensions, Electricians' Bits, Tubing Benders, Radio Chassis Punches, and many more. Write for free catalog No. 35-H.

TOOLS FOR CRAFTSMEN
GREENLEE

GREENLEE TOOL CO.

2025 Twelfth St., Rockford, Illinois

COLOR DYNAMICS throughout the entire new Warner & Swasey plant in New Philadelphia, Ohio, gives workers increased visibility, greater safety and a psychological incentive for stepping up their activity—all of which results in greater production.

More Efficient, Cheerful and Safer Working Conditions with...

Pittsburgh® COLOR DYNAMICS

Modern educators in vocational science are teaching tomorrow's shopmen how this new painting method improves productivity and housekeeping.

Training of skilled shopmen is no longer confined to courses in metals, machinery and methods. It includes study of the influence of color upon workmen and their output.

Many educators are now including Pittsburgh's system of COLOR DYNAMICS in their training programs. They recognize that greater knowledge of the art of putting color to work is contributing to the welfare and productive efficiency of workers.

By applying color on machines, the operator's attention is focused better on his task. Focal colors help him to distinguish working parts from production materials. Eye travel is reduced, lessening both eye and physical fatigue.

COLOR DYNAMICS also shows students how morale-building colors are used in promoting cheerfulness. They learn, too, how safety colors are applied on floors and mobile equipment to reduce accident hazards.

This system of painting is now recognized as a distinct advance in production technique. If you wish your students to be prepared adequately for their future tasks, begin now to include Pittsburgh's system of COLOR DYNAMICS as part of your vocational training course.

Get a COLOR DYNAMICS Engineering Study of Your Classrooms—FREE!

● Write today for a free copy of our booklet on COLOR DYNAMICS in industry, which explains in detail the principles of this painting method and how to use them. For a practical demonstration of the benefits of this system, paint the walls, ceilings and machines of your classroom according to these principles. We'll be glad to make a FREE color engineering study for you. Call your nearest Pittsburgh Plate Glass Company branch and arrange to have a color expert see you at your convenience. Or mail this coupon.

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Pittsburgh Plate Glass Co., Paint Div.
Department IA-54, Pittsburgh 22, Pa.

☐ Please send me a FREE copy of your booklet, "Color Dynamics."

☐ Please have representative call for Color Dynamics Survey without obligation on our part.

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PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS • FIBER GLASS

PITTSBURGH PLATE GLASS COMPANY

IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED

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PRECISION PRODUCTION

with ROCKFORD ECONOMY LATHES

MEDIUM-SIZED
ECONOMY-PRICED

Big Accurate Lead Screw
Independent Feed Shaft
Precision Timken Bearing Spindle
Heavy Tail Stock, Anti-Friction Thrust Bearings
Hobbed and Shaved Headstock Gears
Tool Room Accuracy, Zero Precision Bearings
All-Geared Head, Quad-V-Belt Drive
Heavy Cuts, 16" or 18" Swing, 30" Center Distance
6' Bed, Double Wall Apron, 3100 lbs. Total Weignt

With these features Rockford Lathes offer you either Tool Room or High Production operation, with modern design, ample dimensions and high quality materials.

Ask a Rockford Machine Tool Representative to give you full details on the practical production advantages of these heavy service, medium sized, economy priced machines.

ROCKFORD ECONOMY LATHES—16" and 18"

ROCKFORD MACHINE TOOL CO.
2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

INDUSTRIAL ARTS and VOCATIONAL EDUCATION
The Shop Teachers' Professional Magazine

MAY 1954

Selection of Equipment and Writing Specifications

M. J. RULEY
Supervisor, Industrial Arts and Vocational Education
Tulsa, Okla.

Many industrial-arts teachers and supervisors throughout the country have been and are being faced with the problem of preparing lists of equipment to be purchased for new shops and to modernize old ones. To do this, one must know just what is to be taught in each shop under consideration. It must be known how many students will use the equipment, how much space is available, and what funds have been allocated.

With this information in mind, those responsible for such lists may prepare them in a number of ways. The following procedure has been followed in Tulsa.

Make up temporary lists from catalogs, shop planning manuals, professional magazines, visits to other programs, and any other source available. Next meet with teachers of the various areas, providing each with a temporary equipment list. Through group participation and discussion, a master list can be developed for each shop. Such a standardized list will serve for future use with minor changes as needed.

This list is then approved by the administration and sent to the architect or others in charge of purchasing the equipment by bid or outright purchase.

Such a list should include everything needed to carry on a specific program, however the items should be arranged so that the most essential items may be provided first. Decision as to what is to be purchased from the list in case funds needed are not available takes considerable thought on the part of those involved.

Ordering equipment sounds simple; however many problems arise. Unless each item is carefully specified, misunderstandings may arise on the part of the purchaser or supplier.

Be certain that each item on your list has *all* the necessary information. Follow the most generally accepted method in a uniform and step by step procedure. Many power tool companies identify their products with catalog numbers. You may need only to use this number as it represents a certain unit of the item being ordered. if it is to be an outright purchase. Accessories, motors, etc., must be described in detail. It is well to add specifications of the item of equipment since bidding may be required. Then it is necessary to insert the term "or equal."

Things to remember:

1. Make a master list of equipment needed. (Use all available sources.)
2. List in order of preference or alternate quantities.
3. Investigate all standard makes.
4. Select first quality products.
5. Be specific and detailed in specifications.
6. Discuss equipment with suppliers and ask for quotations and specifications.
7. Select equipment needed and adapted to a particular type of program.

The following sample lists have been used in ordering equipment for our programs in Tulsa.

Sample of original list made up by the school.

Hand Tools — Junior High School

36 only jack planes, Stanley No. 5¼, "Junior," length 11½ in., cutter 1¾ in.
2 only smooth planes, No. 4, Stanley
2 only block planes, No. 118, Stanley
2 only cabinet scraper, No. 80M, Stanley
2 only spokeshaves, No. 151M, Stanley
4 only ratchet braces, No. 923, 8 in., Stanley
3 only hand drills, No. 617, ¼ in., Stanley
2 only bit gauge, No. 49, Stanley
6 only screw drivers, No. 1006, 6 in.
2 only screwdriver bits, No. 26, ⅜ in.
6 only chisels, wood, ½ in., No. 60, Stanley
6 only chisels, wood, ¼ in., No. 60, Stanley
6 only chisels, wood, ⅛ in., No. 60, Stanley
6 only chisels, wood, ¾ in., No. 60, Stanley
6 only chisels, wood, 5/8 in., No. 60, Stanley
6 only chisels, wood, 1 in., No. 60, Stanley
1 only miterbox and saw, No. 244, Stanley
1 only rafter square, No. 100B, Stanley
2 only carpenters square, No. 100-B, Stanley
18 only try squares, No. 12, 8 in., Stanley

Bid Blank for Equipment

Alexander Graham Bell Junior High School
Tulsa, Okla.
Bid for that portion of work known as:

Lot No. 31 Shop Power Tools
(Attach to Form of Proposal)

Item	*Amt.*	*Article*	*Unit Price*	*Total Price*
346	2	Drill press, floor type B	$....	$....
347	1	Drill press, floor type C	....	....
348	1	Drill press, bench type D	....	....
380	2	Forges, gas	....	....
398	1	Furnace, melting, gas	....	....
399	5	Furnace, soldering	....	....
427	1	Grinder, A floor	....	....
428	1	Grinder, B floor	....	....
429	1	Grinder, bench A	....	....
430	1	Grinder, bench B	....	....
431	1	Grinder, bench C	....	....
432	1	Grinder, oilstone	....	....
460	1	Jointer	....	....
494	2	Lathes, machine	....	....
495	2	Lathes, wood	....	....
670	1	Pot, glue	....	....
736	1	Rotary machine, combination	....	....

Total (same as shown on Form of Proposal) $....
Date of Delivery..... Signed.....
By.....
.....

Room Index for Equipment

Room 52 — Junior High School — Woodwork

Item	*Amt.*	*Article*	*Lot. No.*
20	1	Bars, ripping	26
49	1	Bevels, sliding T	26
51	1 set	Bits, auger	26
56	1	Bits, expansive, B	26
57	2	Bits, screw driver, ⅜ in.	26
70	36	Boards, drawing, 16 by 21 in.	7
99	1	Boxes, miter and saw	26
101	12	Brushes, bench, 10 in.	26
120	1	Burnishers, scraper blade	26
135	2	Calipers, inside, 8 in.	26
137	2	Calipers, outside, 8 in.	26
144	2	Cans, oil, ½ pt.	26
145	4	Cans, safety	26
151	6	Cards, file and brush	26
190	2	Chisels, cold, ½ in.	26
191	2	Chisels, cold, ¾ in.	26
200	4	Clamps, bar, B	26
204	4	Clamps, *C*, C	26
205	4	Clamps, *C*, D	26
206	4	Clamps, *C*, E	26
209	12	Clamps, hand screw, 8 in.	26
210	12	Clamps, hand screw, 12 in.	26
222	2	Compasses, pencil, A	7
223	36	Compasses, pencil, B	7
233	2	Countersinks	26
277	2	Dividers, extension, 8 in.	26
283	1	Drills, automatic	26

Item Specifications for Equipment

Item No. 578 — Planes, block

This item shall be a Stanley block plane No. 118, or an approved equal.

Lot No. 26 Total number required *4*

To be delivered and placed in room.

Amt.	Rm.	Amt.	Rm.
2	49	2	52

Item No. 579 — Planes, jack

This item shall be a Stanley jack junior plane No. 5¼ or approved equal, 11½ in. long, 1¾-in. cutter.

Lot No. 26 Total number required *40*

To be delivered and placed in room.

Amt.	Rm.	Amt.	Rm.
4	49	36	52

Item No. 683 — Saws, circular, tilting arbor

This item shall be a Delta tilting arbor circular saw model No. 34–405, or an approved equal. Complete with the following:

1 No. 34–405 complete 10-in. tilting arbor unisaw for 60 cycle service, with No. 1455 pair of side extension wings, micro set rip fence; No. 1015 combination blade; No. 864 miter gauge, front graduated guide bar; No. 1449 motor pulley; three No. 291 V belts and No. 1471 super-safe guard

1 No. 87–210 electric motor for above 10-in. saw, 1½ hp., 3-phase, 220/440 volt, 60 cycle a.c., 1725 r.p.m., with ¾-in. shaft

1 No. 1329 3-phase across-the-line magnetic starter with overload and underload voltage protection, start-stop and reset button mounted in cover, and relays for motors up to 2 hp.

1 Overload, Square D

1 10 in. by ⅝-in. arbor hollow ground combination saw, miter crosscut and rip (Atkins)

1 No. 1017 Delta 10 in. by ⅝-in. arbor ripsaw

1 No. 1018 Delta 10 in. ⅝-in. arbor crosscut saw

1 No. 333 Delta 6 in. diameter by $^{13}/_{16}$ in. thick by ⅝-in. arbor dado cutter

This item shall be installed where and as shown on the plans, as a part of the unit construction. Fittings, connections, and/or other necessary construction to make a complete and approved job.

Lot No. 28 Total number required *1*

Amt.	Rm.
1	50

Item No. 693 — Saws, jig, scroll

This item shall be a Delta jig scroll saw model No. 40–205, or an approved equal. Complete with the following:

1 No. 40–205 Four-speed 24-in. Delta scroll saw with steel stand, 4-step cone pulley for motor, ½-in. bore, V belt, belt and pulley guard, one saber blade, and three jeweler's blades

1 No. 62–110 electric motor for above, ⅓ hp. capacitor type, 115/230 *V* a.c., 60 cycle, single phase shaft, diameter ½ in. with cord and 3-way safety plug

Specifications

Capacity arm to saw	24 in.
Thickness of cut	1¾ in.
Table size	14 by 14 in.
Table tilts	right, left, front
Table from floor	42¼ in.
Over height	55 in.
Width	15 in.
Length	36 in.
Cutting strokes per minute	610, 910, 1255, and 1725

Lot No. 28 Total number required *3*

Amt.	Rm.	Amt.	Rm.
2	49	1	50

Sources of Industrial-Arts Content

DR. HOMER J. SMITH
Professor of Industrial Education
University of Minnesota
Minneapolis, Minn.

A half-day session of the Fortieth Annual Meeting of the Industrial Arts Conference of the Mississippi Valley (Chicago, November 12–14, 1953) was devoted to consideration of ways in which the content of industrial-arts courses in our schools should be derived. Three presentations were made, and these were followed by a discussion period in which all persons present had opportunity to participate.

Dr. Smith distributed the materials here shown, in mimeographed form, and emphasized certain items of the outline. He sought to review the objectives or outcomes of such instruction and the problems of administrators and teachers related thereto. Dr. H. H. London, University of Missouri, and Dr. Ralph C. Wenrich, University of Michigan, then, by similar procedures, placed before us two current points of view as to selection and development of content for the attainment of desired results. These somewhat conflicting, yet interdependent and complementary, approaches are indicated at the close of this article.

Some Patterns of Planning

(For the Attainment of Worthy Outcomes in Industrial Arts)

The following statements, *singly*, indicate the beliefs of many authors as to what should be considered basic to the determination of course offerings and teacher or departmental attempts. Those present will easily identify the authors of many of these sets of aims or claims, scattered in our literature.

What knowledge is of most worth?
Health, fundamental processes, worthy home membership, citizenship, leisure time, vocation, ethical character
Practical efficiency, recreation, social intercourse, parental activities
Food, clothing, shelter, utensils, records, tools, and machines
Altering, assembling, forming, depicting, operating
Manipulative skills, industrial knowledge, domestic intelligence
Fundamental processes, individual bents, character traits
Manipulative processes, materials, industrial development, self-expression, occupations
Skills, informations, appreciations, attitudes
Acquaintance, exploration, training, upgrading, retaining, adjustment, marginal facility
Service to self, to fellows, to school, to community, etc.
Forms of impulse — manipulative, investigative or inquisitive, social, aesthetic
Student urges — manipulation, imitation, co-operation, competition, etc.
Kinds of information — necessary, broadening, guidance
Home and school provisions, school and community environments, raw materials, manufacture and distribution, types of occupations, problems of workers
Work attitudes — youth, parents, employers, labor, administrators
Projects and jobs — individual, group, combination, seasonal, construction, repair, production, drill
Raw materials, classes of workers, occupations needing recruits
Symmetrical growth, creative power, worldwiseness
Intelligence, aptitude, interest, emotional pattern, physical status, urges
Correlation and integration as distinct unifying concepts
Understanding of mechanical, social, and artistic surroundings
Train generally, train specifically, early or near to work time
Discovery of talent, preliminary training, and job supervision
Self-activity, reasoning, judgment, and discipline

Some Questions of Emphasis

(We are under constant necessity of choice in these situations.)

Immediate needs	*or*	Deferred values
Match local conditions	*or*	Mobile population assumed
Student interests	*or*	Reasonable regimentation
Largely manipulative	*or*	Strong on related content
Hand tools and processes	*or*	Machine work
Exercises, projects, etc.	*or*	Production jobs and repair
Knowledge and appreciation	*or*	Salable skills and abilities
Work concept	*or*	Play concept
Product for possession	*or*	Problem-solving base
Student weaknesses erased	*or*	Student strengths enhanced
Doing	*or*	Planning to do
Preparatory	*or*	Terminal
Versatility	*or*	Specialization
Essentials	*or*	Enrichment
Group work stressed	*or*	Largely individual teaching
Brief daily periods	*or*	Concentrated time
Progression by difficulty	*or*	Progression on some other plan
Trials for acquaintance	*or*	Repetition for accuracy and speed
Work confined to classroom	*or*	Home study assumed
Student standards	*or*	Occupational standards
Shops like shops	*or*	Shops like laboratories

Objectives and Emphases

(Industrial Education)
(Industrial Arts or Trade Education or Both)

Many students in certain of my college classes over a period of years have been requested, by the use of code letters, to identify the outcomes to be assumed from either or both phases of our curriculum area. Tabulation shows much overlapping or indecision. It might be useful to publish, later, these frequencies of opinion because they suggest the desirability of better understanding of the provinces of the two phases of our field.

Symmetrical growth	Habit of observation, inquiry
Hand-eye co-ordination	Learn accuracy, orderliness
Enrichment of other subjects	Sense of value of time
School morale	Respect for property
Handyman abilities	Man teacher more hours
Urge to manipulate	Social adaptiveness
Test thought by action	Applications — English, mathematics, science
Self-exploration	Art and design concepts
Self-discipline	Attitude toward criticism
Pride in abilitiy to do	Planning ability, problem solving
Independence and initiative	Later recreational interest
Interpret environment	Consumer appreciation
Habits of industry	New reading interests
Resourcefulness	Physical activity, break monotony
Increase of vocabulary	Self and group competition
Safety made specific	Co-operativeness
Broad, informative, explanatory	Raw materials and resources
Industry's importance, dignity	Learn to follow directions
Respect for skillful persons	Motivation toward high standards
Sense of value of materials	Use consumer goods, make business
Foundational skills	Semiprofessional assistance
Occupational choice	Upgrading while employed
Sense of work conditions	Retaining for new work
A selective agent	Marginal facility for transfer
Preliminary training	Erase weaknesses, enhance strengths
Readiness for minor jobs	Conversion, wartime to peacetime jobs
Preparation for trades	Occupational therapy, rehabilitation
Base for technical professions	Adult recreational type

Do Industrial-Arts Teachers Know?

The aims of education as a whole, in American life?
The aims of the schools in which they serve, of certain specific types or levels?
The aims of our curriculum area, as it should give aid in the functioning of a typical school?
The specific contribution of the industrial subjects, taught by a teacher in his department of a given school?

Do They Act in These Assumed Ways?

(A Set of Objectives Formulated Forty Years Ago)

Canvass was made of 29 pertinent statements on objectives in the literature of 1918 through 1923. Authors were Bawden — Bennett — Bobbitt (2) — Bonser — Brewer — Briggs — Carman — Charters — Eckert — Edgerton (2) — Groshong — King — Klein — Leavitt — Leonard — Mays — MacDonald — McKinney (2) — Sharkey — Snedden (3) — Stark — Starkweather — Winslow — Woellner. Attention was given also to materials provided in mimeographed form at a recent teacher-training conference by Cox, Newell, Roberts and Schweickhard. (Manual Arts Conference.)

Eleven objectives seemed clearly substantiated and these were telescoped and explained in a proposed set of *six*.

Six Proposed Objectives*

1. *To develop skill in the use of common tools.*
   (For more worthy home membership, avocational purposes, and general preliminary training.)
2. *To afford industrial information and social intelligence.*
   (For a better understanding of the materials and processes of manufacture, the economic necessity and social usefulness of skillful labor, and the conditions and problems of industrial employment.)
3. *To foster appreciation of good materials and workmanship.*

*Smith, Homer J., *Industrial Education in the Public Schools of Minnesota*. A Detailed Study of Its History and Present Practice, With Suggestions (Minneapolis: University of Minnesota Press), Ed. Mono. No. 6 (1924), 153 pp. (out of print). Chapter VI, "Our Objectives and the Means of Their Attainment," pp. 116-137.

(For intelligent and discriminating selection of manufactured products for home and business consumption and the proper valuation of substantial and beautiful constructions in the environment.)

4. *To further intelligent choices of life occupations.*
   (For wider knowledge of the requirements of industrial jobs and positions, for better understanding of individual abilities and capacities, and for consciousness of the desirability of these two success factors being considered together.)
5. *To inculcate worthy personal traits and attitudes.*
   (For the building of habits of industry, initiative, resourcefulness, independence, exactness, economy, and co-operativeness.)
6. *To provide a measure of specific occupational training.*
   (For advantageous entrance upon and progress in suitable lines of work, when conditions point to early assumption of the responsibilities of earning a living.)

Recent Lists of Specific Objectives (Three A.V.A. Bulletins)

1934 — Standards of Attainment in Industrial Arts Teaching
1946 — Improving Instruction in Industrial Arts
1953 — A Guide To Improving Instruction in Industrial Arts

(We seem to have arrived at the stage of close agreement.)

1934 (12)	*1946* (9)	*1953* (9)
Interest in industrial life	Interest in industry	(Same)
Select wisely, care for and use properly	Appreciation and use	(Same)
Readiness to assist, group co-operation (Make things easy and pleasant for others)	Co-operative attitudes	(Same)
.....	Health and safety	(Same)
Self-reliance and confidence	Self-discipline and initiative	Self-realization and initiative
Pride in ability to do useful things	Interest in achievement	(Same)
Orderly method of procedure	Orderly performance	(Same)
Understanding and ability in drawing	Drawing and design	Drawings and Design
Elementary skills and construction problems	Shop skills and knowledges	(Same)
Good workmanship and design	.....	.....
Self-reliance and confidence	.....	.....
Careful work, no loitering or waste	.....	.....

Stages of Our Work on Objectives

1. Claims, as to what industrial arts *had done* or *was doing* to or for our pupils.
2. Departmental or field purposes announced, as intended *to be attained.*
3. Worthy behavior changes in pupils listed, as the *teachers'* aims or responsibilities.
4. Delineation of the behavior changes to give objectivity or concreteness to the *teachers'* attempts, each aim handled separately.
5. Further delineation, with reference to specific subjects or media, but still in terms of the *teachers.*
6. *Question:* Why no attention to the *pupils'* objectives, rather than to those of the curriculum area, the department, or the teacher? *Who* is it that is experiencing and learning? *Who* is it that is being changed in behavior? *Who* is it that is most subject to and in need of motivation? If the attack were to be reversed, would the youngsters understand our service and seek in definitive ways to co-operate and profit?

Discussion Topics or Questions

How *should* industrial-arts *content* be selected or developed? (There are two currently divergent points of view.)

Should it be derived from an analysis of industrial practices?

Should it be based on the problems, needs, and interests of the learners?

Summary of a Study on the Granting of Credit for Manipulative Work

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The problem of whether graduate credit should be granted for manipulative work has been growing in prominence for the past several years. Although it has been a bold departure from early academic practice, some schools have set up such a program. The present study has been made with a view to clarifying the present status by discovering general trends in thinking and practice, and determining what practice might be advisable for the future.

After covering available written material relative to the subject, questionnaires were sent to high school, college, and university teachers in industrial education, department heads of teacher-training institutions, and supervisors of industrial arts in the United States.

A study of the qualifications of the respondents reveals that 621 of the 1024 have had ten or more years of experience in industrial education. The master's degree is the degree held by most respondents: 78 per cent of the college teachers, 70 per cent of supervisors, 67 per cent of department heads, and 41 per cent of high school teachers hold that degree. Five per cent of all respondents hold doctoral degrees. This indicates a qualified and experienced group of respondents and would presage a valid response with limited aggressiveness.

The following data are the epitomized results from this quest for information:

The present academic degree programs, on the whole, fail to meet the needs of present industrial-arts teachers for these reasons: (1) the number of areas needed cannot be mastered in a four-year program; (2) the need for both more professional and more manipulative training is still felt by a large majority of industrial-education men at graduate levels; (3) the present programs need flexibility, providing for individual needs; (4) the programs need to be more practical, with closer relationship to actual teaching; and (5) a re-evaluation of the goals attempted

under present degree requirements needs to be made in the light of present-day conditions and necessities.

Four-Year Program Not Adequate

Fifty per cent of all respondents indicate that they are working toward a graduate degree: 30 per cent toward the master's degree, 17 per cent toward the doctor of education degree, and 3 per cent toward the doctor of philosophy degree.

Forty-three per cent of bachelor's level respondents state a need for more manipulative work and 13 per cent state a need for professional training. Of the 1016 respondents who hold a bachelor's degree, 625 indicate a feeling that their professional and manipulative training is inadequate for their teaching needs.

Forty-one per cent of respondents who hold the bachelor's degree recommend 40–50 hours as a maximum of manipulative hours at the bachelor's level and 22 per cent recommend 60 hours. This is interesting for it indicates that these educators must feel a compelling need for manipulative training.

A majority of the responding department heads and college teachers stated that they would require teacher trainees to take at least four areas with 7–9 semester hours in each area. Sixty-nine per cent of these respondents would require special training in one area, with an average recommendation of 10–15 hours of work in this special area. Half of the responding department heads, however, feel that increasing the number of required hours in industrial-arts courses would make it more difficult for students to meet degree requirements.

Fifty-four per cent of the supervisors state that bachelor's level teachers, as a whole, lack manipulative ability and 44 per cent feel that bachelor's level teachers, as a whole, lack professional training. Sixty-five per cent of respondents, who are supervisors, find it is necessary to provide in-service courses to make up for degree deficiencies among their teachers.

Need for Manipulative and Professional Training

At the master's level, 33 per cent feel a need for manipulative training and 5 per cent for professional training. Of responding doctors of education, 4 per cent feel a need for manipulative training and 4 per cent for professional training. Of the responding doctors of philosophy, 24 per cent feel a need for manipulative training and 14 per cent feel a need for professional training.

For a head of department to be adequately prepared with even an elementary knowledge of various areas in his department, he needs great breadth of preparation and experience. Responding educators manifest a consciousness of a need for greater breadth and depth of training by the large percentages who plan to further their education during the next biennium. New developments are continually taking place in finishing materials and processes, new designs are being developed, and new areas are being explored. This demands a constant alertness, training, and experimentation.

Of the 594 respondents who hold master's degrees, 239 feel their training was inadequate, even though 36 per cent of them had some manipulative training at the master's level. Eighty-two per cent feel the greatest deficiency in manipulative training and 11 per cent feel the greatest deficiency in professional training.

Two of the 26 responding doctors of education and 8 of the responding doctors of philosophy feel a need for more adequate training.

The professed need for more adequate manipulative training is felt in a range of 50–82 per cent of the 625 responding instructors who feel deficiencies in training. The need for professional training ranged from 11–37 per cent at the various educational levels.

At the master's level, respondents holding that degree recommend as a maximum number of hours of manipulative work various ranges: 58 per cent recommend 10–15 hours. Ninety-one per cent of all respondents who hold a master's degree feel that manipulative work in some degree is appropriate at the master's level.

Sixty-two per cent of responding doctors of education recommend a maximum of 5–20 hours of manipulative work at the doctoral level and 33 per cent of the responding doctors of philosophy recommend a maximum of 5–10 hours of manipulative work at the doctoral level. This seems to signify a growing awareness of a need for reconsideration, re-evaluation, and greater flexibility in degree requirements, especially at the doctoral level.

Ninety-one per cent of all respondents stated that they would prefer to do master's study at an institution where both manipulative and professional courses are offered; 75 per cent stated they would prefer a school which offered both manipulative and professional courses for their doctoral studies.

The plans respondents approved as best for handling manipulative work at the master's level are: (1) allow graduate students to participate in manipulative courses and proceed as far as possible from a starting point determined by their past experience, and (2) have a separate class for graduate students requiring a high type of craftsmanship in order to receive graduate credit. At doctoral level, respondents make plan 2 their first choice and plan 1 their second choice.

A group of veterans studying valve action. Frank Zielinski, instructor. Submitted by John F. Jeffery, director of vocational education, School District, Erie, Pa.

Need of breadth of training for heads of departments and supervisors is indicated by the fact that 75 per cent of the respondents feel that men in these positions should be prepared in the elementary fundamentals of all courses which teachers under them teach.

Forty-four per cent of department heads and 38 per cent of college teachers feel that manipulative offerings at bachelor's level are not adequate in the institutions where they teach. Twenty-three per cent of department heads and 51 per cent of college teachers feel that manipulative offerings are not adequate in the institutions where they teach at the master's level.

The desire to add manipulative work to their training programs was expressed by a majority of college teachers and department heads.

Forty-two department heads stated that their schools are giving graduate credit for manipulative work at the master's level and 8 give graduate credit for some manipulative work at the doctoral level. This indicates that graduate credit for manipulative work is well established at the master's level and to some extent at the doctoral level. The earliest date given by a respondent for establishing this practice was 1914. Sixteen responding schools have initiated this practice during the past five years.

Reasons given for offering graduate credit for manipulative work are: (1) in answer to expressed need; (2) master-teacher objective; (3) individual differences; (4) advanced preparation in research and procedures; and (5) curriculum difficulties.

These values have been experienced by departments following this practice: improved instruction, broadened and enriched curriculum, increased enrollment, professional advancement, professional inducement, and high morale of graduate students who appreciate the practicality of the experiences of the program. Also, according to respondents, the manipulative courses in the graduate program have been conducive to broader programs in industrial arts in the secondary schools and have contributed to better craftsmanship among the students in the secondary schools.

The problems of this practice are listed as: curriculum, qualified students and teachers, small classes, and increased cost. Tradition and individual differences have also caused difficulties in some instances.

Department heads who do not allow graduate credit for manipulative work suggest these methods of overcoming skill deficiencies: take work on undergraduate level, workshops, inservice training, and trade experience.

Fifty-three per cent of supervisors, state that master's level teachers, as a whole, lack manipulative skill and 13 per cent of supervisors feel that master's level teachers, as a whole, lack professional ability.

Graduate Program Lacks Flexibility

The fact that the general preference of respondents who were asked to state how manipulative work on the master's level should be handled was for a plan which would allow graduate students to participate in manipulative courses and proceed as far as possible from a starting point determined by their past experience shows that respondents feel that the program should be based on the need of the student.

Many respondents expressed the opinion that one of the weaknesses of the present doctoral programs is its tendency to shape the individual to the program rather than to shape the program to the needs of the individuals.

Some respondents have suggested the apparent need of operating graduate work on an individual problem basis in the best interest of the student, after making a close analysis and evaluation of his skills, knowledge, experience, interests, and undergraduate training.

The Program to Bear With Closer Relationship to Actual Teaching

The number of courses being taught in industrial-education departments, as shown by this study, is broad in scope and new courses are constantly being added. The demand for training in new courses in several cases exceeds the number of teachers now engaged in teaching these courses. Some of the courses in which a notable number of respondents desire more training are: lapidary, radio, metallurgy, jewelry, printing, metal spinning, design, heat treating, ceramics, auto mechanics, production planning, and plastics.

This indicates that these teachers will probably choose schools which will all owe some manipulative courses at graduate level since so many courses in which they feel the greatest need for training are manipulative courses.

Without exception, large percentages in all groups of respondents feel that the ability of the highly skilled craftsman is as important as the work of the research worker or other professional specialist.

Respondents are almost unanimous in the opinion that manipulative ability and skill and ability to express oneself are primary needs of industrial-arts teachers.

The responding groups showed a wide variance of opinion as to the desirability of trade experience as background for teaching. Trade experience and academic work were rated first and second, respectively, as fields of secondary importance in industrial arts.

All groups of respondents indicated a strong feeling that the removal of skill deficiencies is more important than working toward professional courses and higher degrees.

Present Graduate Degrees Do Not Tend to Produce Master Teachers

A re-evaluation and clarification of goals attempted under present degree requirements is needed. Do these degrees aim at producing only research specialists and aggressive executives? Is there a need to establish a new type of graduate program with the single goal of producing master teachers, with a more carefully selective practice of student acceptance?

The no-degree, bachelor's level and master's level respondents seem to be very dubious about the master-teacher-producing qualities of the doctor of education degree programs. Only one half of the respondents who hold the doctor of education degree feel that the program, in general, tends to produce a master college teacher. Obviously, there is great variation among the many institutions offering the doctor of education degree.

"Work not closely related to actual teaching" was the degree weakness marked most often by respondents, concerning the doctor of education degree. "Needs flexibility to meet individual needs" and "Lack of manipulative work" were second and third among weaknesses of the program, according to respondents. This emphasizes again the fact that educators feel that we need to bring the graduate work down to earth and make it serve a practical purpose.

The majority of supervisors find it necessary to provide in-service training for their teachers in order to overcome the effects of the too narrowly trained teacher and to keep their teachers abreast of the new developments in the field.

Greatest Causes of Teacher Failure

Supervisors listed as the causes of teacher failure the following reasons: (1) lack of professional attitude; (2) lack of training; (3) poor candidate selection; and (4) local systems.

Origins of Public Industrial Education in Philadelphia

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(Concluded from page 135 of the April, 1954, issue)

1918 — Philadelphia Trade School for Girls Opens

The depression and unemployment period beginning in 1915 led a women's group called the Emergency Aid of Pennsylvania to set up experimental classes for women. Girls not less than 14 years of age and who had completed the sixth grade in the elementary school were admitted. These requirements coincided with those recently set up by the state for employment certificates. Instruction was in garment making, power machine work, and custom millinery. A committee of the board of education recommended that the school be taken over by the school system. In 1918 the Trades School for Girls was opened at 11th and Pine Sts. with Miss Cleo Murtland as its first principal. The sum of $13,000 was allotted by the board of education, added to funds available from Smith-Hughes moneys. Miss Ruth Sill became principal in 1920 and served throughout the remainder of the school's existence. Besides full-time trade instruction, the school for some years served continuation school functions, as outlined in the subsequent section. In 1927 the Trades School for Girls was moved into a new building at 13th and Green Sts., and a few years later was formally renamed the Helen Fleisher Vocational School, after one of the women who had done so much to encourage its start. With the onset of World War II and its problems, enrollment declined, and in 1946 the building was turned over to the education of returned servicemen.

The Continuation School Movement

The Pennsylvania School Law effective in 1916 carried this significant provision: "It shall be unlawful for any person to employ any minor between 14 and 16 years of age, unless such minor shall, during the period of such employment, attend, for a period or periods, equivalent to not less than eight hours each week, a school approved by the state superintendent of public instruction."

In order to comply with the law, Philadelphia immediately opened continuation classes in a number of centers throughout the city. To meet immediate needs, classes were held in ten purchased portable buildings. department stores, and other commercial establishments. By 1920 there were more than 11,000 pupils, occupying rooms in 27 elementary school buildings, nine high school buildings, and industrial plants. Students reported one day a week from 8 a.m. to 5 p.m., with six scheduled hours of classroom work and two hours of shopwork. Instruction was on the high school or elementary level, depending on the student. Great obstacles were encountered in preparing teachers and shop facilities, but each problem was attacked with vigor, enthusiasm, and success.

A Division of School Extension and Continuation was formed in 1921. Plans were made to consolidate the continuation classes. This was facilitated somewhat by a temporary decline in enrollment resulting from the Panic of 1921. The Hart Continuation School was organized in 1920 under the principalship of Louis P. Hoyer, who subsequently advanced professionally, becoming superintendent of the entire Philadelphia system in 1947. The McCall School was soon organized, and the Hollingsworth School was combined with the Trade School for Girls. When the Mastbaum Vocational School opened in 1928, it devoted about two thirds of its enrollment to continuation education, and the remainder to all-day unit trade classes. The unit trade classes proved to be very popular, and enrollments continued to rise.

The great depression caused a rapid decline in continuation school enrollment. The Mastbaum Vocational School, McCall School, and the Trade School for Girls gradually expanded their unit trade enrollment, while the Hart School returned to regular elementary school operation. By 1933 the continuation school enrollment was under 2000, while unit trade classes claimed well above that figure. Among the unit trades at the McCall school were tailoring (established 1926), printing, and woodwork. Mastbaum featured auto mechanics, carpentry, drafting, electricity, machine shop, sheet metal, and textiles.

Pennsylvania enacted legislation effective in 1938, raising the compulsory school age to 18 years, thus automatically terminating the continuation school movement in Pennsylvania.

1938 — Two New Institutional Giants

Despite the depression, cornerstones were laid in 1936 for two of the finest vocational school plants that had up to that time been designed. Financial aid for building was provided by a grant from the Federal Emergency Administration of the Public Works. The Bok Vocational School at 8th and Mifflin Sts., and the Dobbins Vocational School at 22nd and Lehigh Ave. are eight-story architectural twins, each with a capacity of 2500 students. Each unit now represents a value in building and equipment estimated at over twelve million dollars.

These schools opened their doors in February, 1938. The McCall School had meanwhile closed, and its faculty and facilities were assigned to the new units and the Mastbaum Vocational School. Despite the gloomy economic outlook and the shadows of approaching war, the beginning was successful. The difficult lessons learned during the earlier painful years were not ignored. Dr. Walter Magill, professor of vocational teacher education at the University of Pennsylvania under Professor Ash, was appointed adviser for the new schools by the board of education. One noteworthy procedure to be established was the screening of persons desiring admission to the schools. Each candidate was interviewed, tested, and investigated for previous school record.[3] This policy

[3]For description of procedure see: Benjamin J. Novak, "The Selection of Students," The Phi Delta Kappan, Apr., 1940. Benjamin J. Novak, "Establishing Admission Standards for Vocation-Schools," INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, Oct., 1944.

throughout the years has been useful in selecting objectively students from among the excess of applicants. It has, further, helped to revise the thinking of many who could not appreciate that success in skilled manual and industrial occupations require certain positive attributes which unfortunately are not automatically present in those who have met with disaster in academic education.

Day school, evening classes, and apprentice groups all were functioning and expanding when the enormous almost immediate needs arose for Defense Training, and later War Production Training. The vocational schools and the industrial shops in the high schools were operated twenty-four hours a day throughout the year. Other buildings were utilized as school annexes. Teachers went into plant and factory to train new workers in production skills, or to aid the newly promoted in supervisory areas. Men in automotive sales and other languishing fields were trained in war producing skills. Women came from homes and offices to learn and practice industrial skills, supplying more voluminous if by now unnecessary evidence of the mechanical aptitude of their sex. At the peak of enrollment in 1942, close to 15,000 persons were on roll at a given time. When the program ended, over 200,000 persons had been trained in 92 trade subjects in automotive, aircraft, metal, shipbuilding, electrical and radio, drafting, woodworking, and other trade areas.

In 1941 Mr. Bauder was elevated from his post as director of industrial arts, held since 1923, to director of vocational education. William E. Brunton was brought from the Pennsylvania Department of Public Instruction to be assistant director in charge of defense training and war production training for Philadelphia. After the war Mr. Brunton became principal of the Bok Vocational School, and upon Mr. Bander's retirement in 1952, was elevated to director of vocational education.

Returning servicemen and women brought new responsibility for Philadelphia's industrial education program. Many veterans elected to receive educational benefits under Public Laws 16 and 346 in vocational schools.

The service rendered to the war effort by vocational industrial education in Philadelphia astonished many, and led more people to appreciate the role of such education for adolescents. It was accepted more generally that school preparation for industry was just as important and respectable as education for the professions and business.

During all the time of wartime turmoil, the vocational schools were quietly developing their day programs for the full-time adolescent students. J. Norwood Baker and Robert Krewson, the first prin-

Evolution of Day School Shop Programs in Philadelphia Public Upper Secondary Schools*

MANUAL TRAINING SCHOOL	COMPREHENSIVE SENIOR HIGH SCHOOL		TRADE OR VOCATIONAL SCHOOL
(Work was essentially Mechanic Arts, College Preparatory in aim, grades 9 to 11)	**Mechanic Arts Curricula** (Non-Vocational in purpose, College Preparatory)	**Industrial Curricula** (Vocational in purpose, Terminal)	**Vocational Curricula** (Terminal)
1. Central Manual Training School, 17th & Wood Streets (1885–1912)	1. Southern Manual Training High School (1907–) (Academic, Commercial, Mechanic Arts)	1. Central High School** opened Industrial Department in 1919 ←	1. Philadelphia Trades School (1906–1919) 12th & Locust Streets. In about 1915 expanded to 17th and Wood Streets. In 1919 became Industrial Department of Central High School
In 1912 building became center for newly formed Mechanic Arts Department of Old Central High School. Principal, many students and teachers went to newly opened West Philadelphia High School →	2. Central High School* opens Mechanic Arts Department in 1912	2. Northeast High School offers industrial curricula beginning 1921 (electrical, automotive, building, mechanical construction)	2. Helen Fleisher Vocational School for Girls (1918–1946) (formerly Philadelphia Trade School for Girls) founded 1916 by Emergency Aid of Pennsylvania
	3. West Philadelphia High School (1912–)	3. Industrial curricula now offered in 10 senior high schools	3. McCall Vocational School, 7th & Delancey Streets (1926–1938)
2. Northeast Manual Training School → Howard below Girard (1890–1912) Became Northeast High School in 1912	4. Northeast High School (1912–)		4. Mastbaum Vocational-Technical School (1929–) Frankford Avenue & Clementine Street
	5. Mechanic Arts Courses now offered in 12 senior high schools (excluded are girls' schools and new Central High School)		5. Bok Vocational-Technical School, 8th & Mifflin Streets (1938–)
			6. Dobbins Vocational-Technical School, 22nd & Lehigh Avenue (1938–)

*Grades 10–12, in some cases formerly 9–11. **Central High School founded in 1838, again becomes exclusively academic — 1939.

cipals of the two new vocational schools, did much vigorous front-line work in furthering and consolidating the day school work. The co-operative employment plan was reactivated during the war, varsity athletic teams developed, and in time high school and technical diplomas were authorized. In recognition of the development of technical curricula, some on the posthigh school level, the three vocational schools were renamed in 1946 vocational-technical schools.

The three vocational-technical schools now enroll over 6300 day students in some 35 different trade curricula. The vocational schools of Philadelphia enroll over 15 per cent of the total secondary school population in grades 10, 11, and 12. These are not all industrial students, since the vocational schools also have students in distributive, home economics, trade exploratory, and commercial curricula.

A History — To What End?

If other local histories were to be searched, many cities and states would find a Murrell Dobbins and Professor Ash of their own. They should not be forgotten. Stalwarts such as these are important not only for their thinking and material contributions, but because of their inspiring and vigorous personalities. Industrial education has an honorable tradition that is made real and alive by the warmth of the people who have created it.

The historical evidence makes apparent that wars, depressions, and even the ebb and flow of less eventful years bring changing needs and problems. Co-operative employment plans, apprenticeship programs, and many other practices, flourished, then waned with changing conditions. Each has been revived and improved upon by alert educators as needs were recognized in new settings. The knowledge that change is inevitable permits adjustments to be made to new conditions with less reluctance. No worthy educator can afford to be so immersed in his day-to-day duties that he cannot glance to the past for perspective in looking ahead to tomorrow.

Industrial education has climbed resolutely and steadily in the esteem of educators and the general public. It is a mistake to feel that resting on a plateau of status quo will suffice. Sufficient time has elapsed for consolidating gains. The current need is for new exertions. Memories are short, and many have already forgotten their indebtedness of World War II to industrial education. Many of the newer generation have not heard how much industrial education means to the preservation, material progress, and happiness of our country and its people.

Charles A. Prosser, Murrell Dobbins, and their like, are again needed to place before the public the cause of industrial education with conviction, determination, and eloquence.

Some Sources

Many sources were consulted for historical data. Major indebtedness for events prior to 1917 is to Dr. Edward M. Fee's book, which was drawn upon most heavily.

Professor William C. Ash, Elmer Briggs, Dr. Robert L. Haney, and many other persons patiently and cheerfully explored their years of experience to supply and verify many facts which would otherwise have been obscured or overlooked.

A partial list of printed sources follows:

1. *Annual Reports of Division of Industrial Arts and Vocational Education*, Philadelphia, 1923–37.

2. *Annual Reports of Division of School Extension*, Philadelphia.

3. Bauder, Charles F., *The Philadelphia Public Schools Train for the Industrial Front*, School District of Philadelphia, 1944.

4. Fee, Edward M., *The Origin and Growth of Vocational Industrial Education in Philadelphia to 1917*, Philadelphia, 1938.

5. Journals of Philadelphia Board of Public Education.

6. Reports of the Board of Public Education, Philadelphia Public Schools.

7. Schoolmen's Week Proceedings, University of Pennsylvania, 1931. Vocational Schools in the Philadelphia Program, by Charles F. Bauder.

The Graduate Job Seeker

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Buffalo, N. Y.

June — graduation — job hunting. Within a short time this will be the theme of thousands of young men and women prepared to teach industrial arts. The most difficult thing will be to find a desirable job. Most teaching positions are gained through school and state placement centers, private teacher agencies (at a fee), civil service examinations, and by the method of individual efforts. I chose the latter.

The scheme was to advertise myself through the use of a "personal profile" booklet. The method itself is not original, but the product is. I felt that by contacting a prospective employer through a sample of my own work he would gain a closer insight into my personality and ability.

The plan called for a 5½ by 8-in. booklet and a printed letter with space allotted for a typewritten inside address. Both would be placed in an envelope and mailed at a total cost of six cents each including postage.

The first step in the actual composition was to put down in words all pertinent personal data of the past, present, and future. This information was then *tailored* to fit the particular job desired; namely, a position as industrial-arts teacher. The underlying thought was always "What information would the employer want to know about me?"

The data was then grouped under convenient headings. The copy was placed with equal weight on all four pages. It was set in Roman style type, printed upon a platen press, and stapled into booklet form. A half tone placed on the cover gave an added sense of individuality.

Personal Data:

Age:	26 years. Born June 23, 1924 at Buffalo, N. Y.
Height:	6 Feet.
Weight:	195 Pounds.
Marital Status:	Married, no children.
Wife:	Mary Strodel Bartel. Employed as billing clerk by the Buffalo Forge Company.
Appearance:	Neat and clean.
Health:	Excellent. Have not been absent a single day from either high school or college.

Vocational Background:

June 1942–Feb. 1943	Art Stained Shingle Co. Fabricator of shingle panels. Good wages. Fast, skillful work. Reason for leaving: Shutdown.
March 1943–Feb. 1946	United States Marine Corps. Radar technician. Corporal rating.
Feb. 1946–Jan. 1947	Fetch Co., Buffalo, N. Y. Fabricator of shingle panels. Reason for leaving: Shutdown.
Jan. 1947–Aug. 1947	Colonial Radio Corp., Buffalo, N. Y. Punch press operator. Promoted to die setter. Reason for leaving: Enter college.
Sept. 1948–June 1950	N. Y. State College for Teachers at Buffalo. Student helper in Graphic Arts Shop.
June 1950–	Harold Wood Co., Buffalo, N. Y. Part time work. Very valuable experience for Industrial Arts.

College Courses and Grades:

Mechanical Drawing 1	A	General Mathematics	B
Mechanical Drawing 2	A	Essentials of In. Arts 1	B
Electrical Shop	A	Essentials of In. Arts 2	B
Physics 1	A	English Literature	B
Physics 2	A	Psychology	B
Applied Mathematics	A	English Composition	B
Graphic Arts	A	Chemistry 2	B
American Government 1	A	Industrial History	B
American Government 2	A	Algebra	B
English Speech 2	A	Ceramics	B
Chemistry 1	A	Textiles	B
Small House Planning	A	Geology	B
Plane Trigonometry	A	Science Teaching	B
Physical Science	A	General Shop	B
Wood Shop	A	Astronomy	B
Transportation Shop	A	Driver Education	B
Contemporary History	A	English Speech 1	C
Metal Shop	A	Principles of In. Arts 1	C
Principles of In. Arts 3	A	Principles of In. Arts 2	C
Biology	A	Practicum in Teaching	

Other Experiences Helpful in Teaching:

U. S. Marines:	Three years of service. Honorable discharge. Developed responsibility and leadership.
Hobbies:	All sports, especially golf, bowling, and hiking. Home workshop. House planning. Science study. Kodachrome slides.
Travel:	My travels have included visits to all areas of the United States, parts of Canada, and overseas to Panama, Los Negros, Guadalcanal, Hawaii, and Guam.
Responsibility:	Have a small bank account, no debts or liabilities, excellent credit rating, own a 1950 Plymouth automobile, and am now saving up money for a home which I hope to build by myself in the near future. Can move immediately.

Educational Background:

High School:	Seneca Vocational High School, Buffalo, N. Y. Graduated June 1942. Electrical course. Average 89. Obtained a New York State diploma. Won a sports letter in baseball.
Service School:	Camp Lejeune, New River, N. C. Radar technician school.
Correspondence:	Practical Telephony Course. I.C.S. Taken while in the Marine Corps.
College:	New York State College for Teachers at Buffalo, New York. Will graduate in January, 1951. Industrial Arts curriculum. I am at present student teaching at the Amherst Central High School, Snyder, New York. Have been on the Dean's honor roll every semester in college. Am a member of Epsilon Pi Tau, honorary Industrial Arts fraternity, and Kappa Delta Pi, honorary educational society. Will have completed the four-year course in three and one-half years and have 137 hours of credit, nine more than necessary for graduation. I have worked part time throughout college. Extracurricular activity included service as a Junior Counsellor, membership in Psi Phi Fraternity, editor of the "Psi Phi News," Epsilon Pi Tau conference work, dances, interfraternity sports and social gatherings.

References:

Dr. Marvin Rapp
History Instructor
New York State College for Teachers
Buffalo, New York.

Mr. Donald Brossman
Graphic Arts Instructor
New York State College for Teachers
Buffalo, New York.

Mr. Owen Harlan
General Shop Instructor
New York State College for Teachers
Buffalo, New York.

Mr. Irving Perkins
Head of the Industrial Arts Department
New York State College for Teachers
Buffalo, New York.

Mr. Richard Wood
Employer at the Harold Wood Company
225 Rodney Street
Buffalo, New York.

Future Intentions:

If I am unable to secure a teaching position for January, 1951, I shall immediately start work on a Master's degree at the University of Buffalo. By the end of August, I will have most of the requirements completed and still remain available for a position in September.

This Personal Profile was designed, composed, and printed by the author.

This is the profile of

PHOTOGRAPH

Edward R. Bartel
246 Strauss Street
Buffalo, New York

.....who desires a position as teacher of Industrial Arts, Mechanical Drawing, Driver Education and Safety, or Science.

Three hundred and thirty-seven of these profile booklets were distributed to school superintendents as follows:

State	*Profiles Sent*	*Replies*	*Per Cent Replies*
Maine	26	2	8
New Hampshire	18	2	11
Vermont	54	3	6
New York	192	45	23
Rhode Island	15	3	20
Connecticut	32	8	25
Total	337	63	18

It should be noted that Maine, New Hampshire, and Vermont have teacher placement agencies (unknown to author at the time) and that the best statistical interpretation would be gained by an analysis of the New York State data.

Of the 63 replies, nine job possibilities resulted which eventually led to several interviews and finally to a teaching contract. Practically all of the returns included statements that the credentials would be kept on file for future reference. Many letters were extremely complimentary and I was pleased that not one disparaging reply was received.

Yes, June is coming and so is graduation, but, as for job hunting, that's a settled matter.

Notes on Industrial-Arts Requisitions

PAUL C. HOOPES
Abraham Clark High School
Roselle, N. J.

One sometimes wonders why hardware merchants act as they do, and perhaps they wonder why requisitions written by industrial-arts teachers feature occasional items rarely seen in hardware stores. In order to normalize what appears as an enigma one must look behind the merchant's counter and see how he does the important business of buying.

In the hardware business there are very often two middle men, the distributor and the retail merchant. The retail customer seldom hears of the distributor and in like manner the merchant seldom deals directly with the manufacturer. In any given area there is likely to be one or two large distributors competing for business. The local merchant is the outlet for these distributors. He has an open account, he can order by phone, or give his order directly to a traveling salesman, he has few letters to write, his accounts are simplified and he is in touch with supply looking toward delivery dates. The distributor prompts his ordering of seasonal items, recommends good movers and has an interest in promoting the merchant's sales.

Usually paints are separated from the regular line of hardware and we find the merchant with an agency for one line of paints and finishes. He will be unwilling to bid on or furnish items from a competing line. This is sometimes stretched to include not only the main line but also a couple of rather specialized minor brands which are not too competitive with the main line.

Not realizing these various phases of business behind the scenes, we, the local shop instructors, simply cannot understand why that fellow in the hardware store shows so little interest in that special brass hardware that can't be found, but which appears on this or that item of furniture in the trade (it might be any other hard-to-get item). The truth of the matter is that we as individual consumers of such items have such small buying power that we are more bother than value. We are educators, and are primarily interested in a learning process as a result. The merchant is interested in profit on the dollar of investment as a result. In this there is a vast difference and on the surface this difference is not compatible. Only when the school man will undertake to help himself by understanding the problems of the merchant, can the problem of purchasing assume a rational outlook.

Consider the matter of brads — did you ever try to purchase a box of 1½-in. No. 18 brads? They are a little wanted item and are called for so seldom that the merchant hesitates to put a 20 pound carton (which is standard packing), on his shelf, selling perhaps a pound a year. This is simply not good business. If you request the minimum amount that he must purchase, you will get them as fast as supply and delivery permit. This is the *gimmick* that stops you from finding many items that you, and only you, would like to find in stock. A dead inventory makes no money and is a direct route to the receiver's hands. You just can't blame the merchant for avoiding such a bad practice.

One troublesome point for the merchant is produced by sending out a list for bids that contains all kinds of items from artist's water colors to buzz saws. There are some places of business that do carry anything and everything that can be classed as hardware but they are not found very frequently. Such a list puts the merchant on a spot especially if he needs the business. Consider the items that he cannot supply from stock or distributor. He can do three things about them, ignore them, list his bid and make it low on these items with no intention of ever making delivery or list his bid high enough to enable him to shop for the stuff and make delivery. In neither case

have you improved your position by being a buyer of quantity. If requesting bids is intended to save money and stretch a budget it cannot be effective without serious and intelligent consideration of the retail sources of the items sought. Items should be sought only through those channels in which they are regularly sold.

There are occasional items which because of design or quality fall into the "No substitutes accepted" class. However there are other items, that because of the highly competitive nature of their field, may offer the purchaser a choice from half dozen brands, any one of which is the equal of the others. Abrasive paper, screws, and nails come to mind as examples of such items. If your list is to be sent to several merchants for bids, you may be sure that you will make life easier for them, if, after you specify the brand which you favor, the words *Or equal* are inserted. Your list would perhaps read "100 sheets No. 2/0, Itch and Scratch Co. or equal, Garnet Cabinet Paper." If, per chance, you have a gyp artist on your list of bidders, either remove his name or insist upon *No Substitutes* from him.

The trade journal for the hardware business is called the "Hardware Age." Yearly, the editors publish a hardware buyer's directory. It's a dilly. Everything is listed from machetes to Xmas tree ornaments. The merchant won't use this information to accommodate you unless you intend to purchase enough to make him a profit and with no dead stock. He will, however, donate his old directory, when the new one reaches him, to the bettering of the educational effort. For school use a matter of a few years' age means little. The one which is still used by the writer is dated July, 1947 — five and a half years old.

Naturally after you are the proud owner of a buyer's directory you must learn to use it. Some manufacturers will sell direct, especially if they have no retail outlet in your territory. Others will always insist upon your purchasing from a retailer. A letter of inquiry on school stationery will usually bring co-operative results. Remember — write an intelligent and sensible inquiry. Remember too that you may not count the effort to write your letter as a cost but the reply you expect is going to cost some firm some money. You wish their assistance, not their disgust.

Anything can be bought that is manufactured to sell *provided* you will purchase in standard package lots or persist in your inquiry until a retail outlet is discovered that sells broken package lots. Your local merchant *is* in business for his health which depends upon making his turnover show a profit. He can't be expected to lose money on your purchases just because you teach school shopwork. Inform yourself and learn how to buy. The process will be both interesting and educational.

NOTE — This is not intended to be an exhaustive treatise on the matter of buying but simply an indicator of a direction in which to proceed. Much that you need to know in this world is not contained in books. Consult your hardware merchant.

Project Design for Teachers

ALEXANDER F. BICK
Milwaukee, Wis.

(Continued from page 53 of the February, 1954, issue)

Small Wood Projects

To be able to design these projects is not a mysterious gift to a few. It is the special interest of the few to be sure, but since the influence of teachers on and through their students makes its imprint on the lives and aspects for many years to come, whatever principles and patterns affect lives should be of interest to teachers.

It is truly a gift to be able to design at will, but make no mistake about it, it is your gift to yourself; the result of your work, your time, your decision to invest effort and thought to gain the freedom.

The required genius comes to him who makes the initial move toward developing it. Use the capacity and it produces and invents as you direct it; deny it and it remains dormant.

Ability to design is a function which stands solidly: (1) on knowledge of current utilitarian forms, and (2) on feeling for the right application of timely symbols. It stands also on practical knowledge of woodworking methods, woods, etc.

To some so-called practical minds, uneducated and unwilling to be troubled about it, the second requirement is "beyond comprehension." Education, by which we mean organized approach whether formal or self-directed, aligns the understanding with current thought and method until its logic brings comprehension. It is education in design, therefore, that is needed before its mystery dissolves. It is true that the whole subject of design is as broad as is the history of civilization: quite a bit for anyone to comprehend in a lifetime. In this series of articles the subject of design is narrowed to include a clearly defined area within the subarea "Furniture Design." This narrowed area, "Contemporary Design" is within the bounds of any intellect to comprehend.

While other areas are approached in other ways, the contemporary furniture area is approached in this simple way:

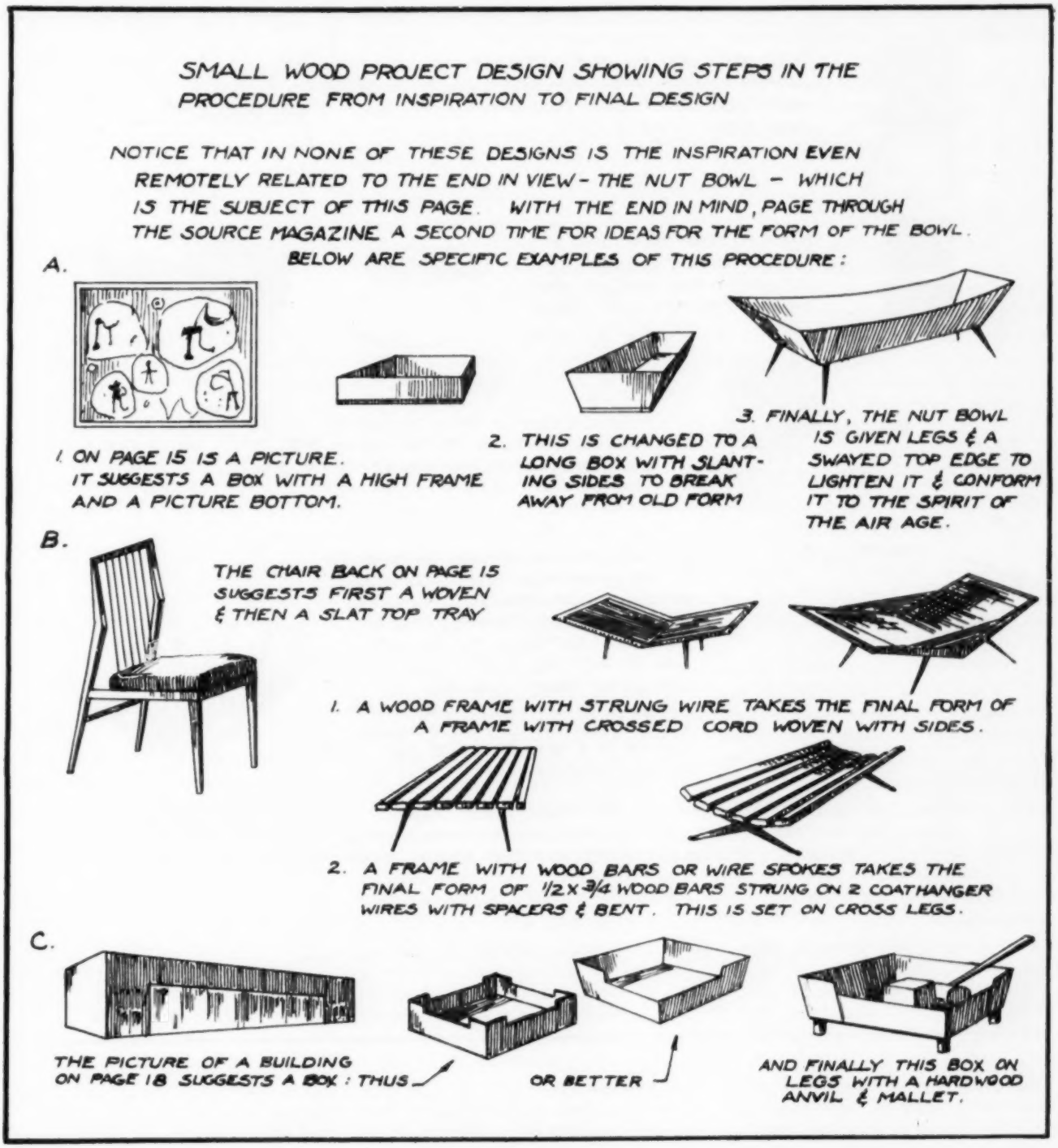
1. The project is designed without art or symbol. It is given the form in which it is most useful for its function. If the project is to be a table it is given legs to stand on, rails to brace the legs, and top to write on. It is made strong, yet light enough to be easily handled. Material dimensions are cut for economy. Such design is pure engineering.

2. In this step, art is added to function. Art in contemporary design is merely the imprinting upon function, the essence of the age: we think of it as air age to give it meaning. We then have a tangible idea to add to function.

To explain the nature of both the practical and the *art* steps in creative work we offer the following examples:

If plaster fell from my stucco house I could nail a sheet of plywood over the spot. This is a practical and functional solution, but I want my patch to fit the spirit of the surroundings so I buy comparable material and apply it in a way to reproduce the original. Adding *art* to function is merely adding the spirit of the present. Again, if I were asked to make a cardboard candy box for a children's party, I may not allow it to resemble a shoe box or a hardware box unless I regarded only function, in which case I could say that any box will hold candy. This is physically true. However, if I am sensitive to the spirit of the occasion, I must modify the box to give it a youthful form and cover it with pink and white striped paper and a ribbon to symbolize the party. Thereby I add to function the essence of the party idea.

Furthermore, were I to send a child to


SMALL WOOD PROJECT DESIGN SHOWING STEPS IN THE PROCEDURE FROM INSPIRATION TO FINAL DESIGN
NOTICE THAT IN NONE OF THESE DESIGNS IS THE INSPIRATION EVEN REMOTELY RELATED TO THE END IN VIEW - THE NUT BOWL - WHICH IS THE SUBJECT OF THIS PAGE. WITH THE END IN MIND, PAGE THROUGH THE SOURCE MAGAZINE A SECOND TIME FOR IDEAS FOR THE FORM OF THE BOWL.
BELOW ARE SPECIFIC EXAMPLES OF THIS PROCEDURE:
A.
1. ON PAGE 15 IS A PICTURE. IT SUGGESTS A BOX WITH A HIGH FRAME AND A PICTURE BOTTOM.
2. THIS IS CHANGED TO A LONG BOX WITH SLANTING SIDES TO BREAK AWAY FROM OLD FORM
3. FINALLY, THE NUT BOWL IS GIVEN LEGS & A SWAYED TOP EDGE TO LIGHTEN IT & CONFORM IT TO THE SPIRIT OF THE AIR AGE.
B.
THE CHAIR BACK ON PAGE 15 SUGGESTS FIRST A WOVEN & THEN A SLAT TOP TRAY
1. A WOOD FRAME WITH STRUNG WIRE TAKES THE FINAL FORM OF A FRAME WITH CROSSED CORD WOVEN WITH SIDES.
2. A FRAME WITH WOOD BARS OR WIRE SPOKES TAKES THE FINAL FORM OF 1/2 X 3/4 WOOD BARS STRUNG ON 2 COATHANGER WIRES WITH SPACERS & BENT. THIS IS SET ON CROSS LEGS.
C.
THE PICTURE OF A BUILDING ON PAGE 18 SUGGESTS A BOX: THUS
OR BETTER
AND FINALLY THIS BOX ON LEGS WITH A HARDWOOD ANVIL & MALLET.

a party I would dress it in party clothes: not just clothes, but party clothes. When I design a table, I design not just a table but a table to fit a purpose and a place in this age — the air age, if you please. Therefore, when I design a table I place upon the form itself the spirit of the age by redrawing each part in the spirit of that age, streamlining, simplifying, and lightening until it suits me as the expression I am trying to convey. The legs need not be shaped like airplane wings standing on end, nor does the top need to resemble something in particular: the spirit and essence of the air age may be applied to the table merely by thinning and lightening the weight of parts, opening spaces, smoothing corners, and giving it thereby an upward effect.

The remainder of this article illustrates in detail how a design is made.

1. Starting without so much as an idea for a project, the first question is, "What kind of project shall we make?" The best

D

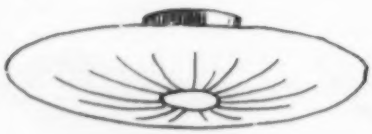
THE WIRE CHAIR ON PAGE 21 IS THE INSPIRATION FOR THE FORM OF A WOOD NUT TRAY WITH TWO WINGS AND WIRE SIDES & LEGS.

E

THE FREEFORM PANELS IN THE ADVERTISEMENT ON PAGE 39 SUGGEST A BOX MADE OF WOOD PANELS FASTENED ON A BASE.

THE BOX FORM IS MADE SQUARE, OCTAGONAL, OR TRAPEZOIDAL. EACH PANEL IS COATED WITH LINSEED OIL AND RUBBED SMOOTH. PANELS ARE COLORED WITH A STRONG BORDER OF RELATED COLOR WITH GREASE CRAYON AROUND A SOLID CENTER COLOR. THE LATTER IS THEN DECORATED BY SCRATCHING A THIN LINE PATTERN SIMILAR TO THE ONE ON THE LEFT. THE PANELS ARE THEN SHELLACKED AND NAILED TO THE BASE.

F



A GLASS CEILING FIXTURE ON PAGE 37 IS THE INSPIRATION FOR A WOOD STAVE BOWL. STAVES ARE CUT 5/16 IN. THICK, RANDOM WIDTHS, TAPERED FROM A COMMON CENTER. STAVES ARE NAILED AROUND A BEVELED CIRCULAR BASE. NAILING IS COVERED WITH A WOOD EMBROIDERY HOOP. TOP RIM IS POWER SANDED TO GIVE IT A SPONTANEOUS DIP. A CORD IS NAILED TO THE RIM.

IN ALL DEVELOPMENTS SHOWN, THE PROCEDURE TOWARD THE FINAL FORM BEGINS WITH FUNCTION AND FROM THAT POINT IT PROGRESSES THROUGH A SERIES OF MODIFICATIONS UNTIL IT BECOMES REPRESENTATIVE OF THE CLEAN, OPEN-SPACED, LIGHT, & PRACTICAL AIR AGE.

OTHER ITEMS ON THE LIST MAY BE HANDLED IN SIMILAR FASHION.

procedure is this: sit down with a professional source magazine, turn pages, keep the mind open for small project ideas, and list those suggested. At the end you may have a list such as this: nut bowl, tray, shadow box, letter file, popcorn basket, candy dish, wall shelf, biscuit tray, blotter roller, deep plant box, lamp, stamp box, etc. Ideas have either a direct or a remote origin, as the illustrations show.

2. Having the ideas, we now repeat the process to find ideas for form. We will take the first item listed and return to the source, which in this case is the June, 1953, issue of the "Interiors Magazine."* Page through, conscious only of the need for ideas for the form of the nut container. Notice on the plate the complete step-by-step development from original inspiration to final design.

Perhaps your first try will not produce a design as professional as your tenth try. Mastery comes with time and continued practice. However, the investment of time and thought in the right approach builds a professional viewpoint and the ability to apply it.

*"Interiors," 11 East 44th St., New York 17, N. Y.

The growing demand for oil products on the nation's farms is emphasized by a recent U. S. Department of Agriculture report stating that tractors in use now total 4,200,000. Before the start of World War II, they numbered only 1,700,000. Truck totals also have risen from 1,100,000 to 2,400,000 on the farms. — *Petroleum Newsnotes.*

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

JOHN J. METZ, Editor

WRITING REQUISITIONS

Again we come to that time of the school year when we have to cast a look into the future to determine what we need to order for the coming school opening a few months hence.

This is always a troublesome procedure and for that reason many teachers may need a little help from someone who has had more experience in this phase of the shop teachers' job. For this reason the INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine has inserted two articles that may be very helpful. The first one is titled "Selection of Equipment and Writing Specifications" by M. J. Ruley on page 159; and the other, "Notes on Industrial-Arts Requisitions" by Paul C. Hoopes on page 169.

It is hoped that these articles written by men well qualified in their field, may be found very helpful.

THE WISE OWL CLUB

Have you such a club in your shop? Membership in this organization is limited to those who save themselves from certain blindness by wearing proper eye protection at the time of the accident.

This club is under the sponsorship of the National Society for the Prevention of Blindness, 1790 Broadway, New York 19, N. Y. The club was founded in 1947. At present more than 1,100,000 workers are employed in plants utilizing the club as a safety measure.

Do your students know about this club? No doubt the National Society will be glad to give you information and posters for your classes. It is just another bit of information that may cause your boys and girls to overlook the discomfort of wearing goggles or other forms of eye protectors and thereby forestall injury and even loss of sight to one of your students.

Tell them about the Wise Owl Club and see that you have eye protectors of some form or other for every student working in your shop. No one knows when an accident will occur.

Dexter Chapple, a Delco-Remy assembler, became eligible for membership in the Wise Owl Club of America last December 9, when a piece of metal flew toward his face, striking the lens of his safety glasses but leaving his eyesight undamaged.

Ceremonies enrolling Chapple were conducted in the offices of H. D. Dawson, the firm's general manager.

Impress on your students that it is wise to protect your eyes at all times.

WORKERS IN BLUE SHIRTS AND WHITE SHIRTS

The INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine is quite proud of the fact that it represents those teachers who give the youth of our land an insight into those activities which have made the industrial progress of our country the envy of the world.

In this world of industry we need men and women who possess many different kinds of abilities. We need the man who sweeps out the shop as much as the man who works on the highest priced machine in that shop. We need men who can invent things, but we also need the man who can make the things that have been invented.

Many inventors would be but mediocre toolmakers or machinists. Many of them would be unable to make the patterns required for the castings used in making the thing or things which they have invented. Still fewer could go into the foundry to make the castings. All of these different abilities are possessed by different personages, and all of them must co-operate before the inventor's idea can be put out as a finished product.

It is very important then that there are workers ready to perform the tasks that are necessary, and naturally the worker must wear clothes that are suitable to the work which he must perform.

The Fords, Ketterings, and Knudsons of this world were not born into this world in white shirts. They, too, wore the shirts, blue or otherwise, which they possessed, until they had climbed to the top of the ladder, before they could wear more dainty clothes.

In the middle ages, some of the guilds adopted uniform styles of dress which set them apart from other artisans. The blue shirt and the white shirt today do not serve such a purpose except in the minds of some who may think that they are of a higher caste because their particular employment permits them to wear clothing that is not soiled by what they are doing.

The Fords, Ketterings, and Knudsons were good mechanics when they worked in the shops, and they are, or were, good men when they had arrived at the pinnacle of their fame. The shirts they wore did not make them great.

Let's forget the snobbishness that underlies some of these pseudo ideals, and impress our students with the idea that they must choose their vocations wisely, and prepare themselves well for the work that they have chosen. After they have done that, they must determine to do a day's work for the pay which they receive. Success will then come, irrespective of the shirts they wear.

WHAT INDUSTRY DOES FOR US

Information on what industry is doing for our country is interesting to teachers and students alike. Some of it is really astounding. Probably as fascinating as anything is the story of progress made by the steel industry.

In 1953 the steel industry in the United States made 111.6 million net tons in steel for casting. In March, 1953, the rate of steel output was almost 120 million tons a year. The highest previous annual production was 105.2 million tons in 1951. These figures were materially reduced, of course, in 1952 because of the long strike.

Thus world steel production jumped approximately 24 million net tons in 1953 to a record high of about 255 million tons. About 18½ million tons of this increase was made by the United States. During this same time the Russian output is reported to have risen about 3.2 million tons to a total of about 41.8 million net tons, or just about one third as much as that made by our country.

The statistics quoted are from "Steel Facts," published by the Iron and Steel Institute. Some people think that statistics are deadening but it seems to the writer that those shown portray a picture which ought to gladden the heart of every American. Our country is accomplishing great things, and let us not overlook the fact that the great things that are accomplished are due to American brain and brawn — not slave labor goaded on by the knout.

PROBLEMS AND PROJECTS

SAFETY FACE SHIELD

WILLIAM B. COLE
Director, Industrial Arts
Dunbar Township High School
Leisenring, Pa.
and
J. F. BARTOSH
Student Teacher
State Teachers College
California, Pa.

One of the most important problems facing any school shop teacher is that of safety, particularly in so far as eye protection is concerned. Ordinary goggles are excellent but boys understandably dislike to wear goggles after another person has dirtied them with oil or grease. In addition, those boys who wear glasses cannot wear the ordinary type of safety goggles. The face shield is quite satisfactory, but this also poses the same problem of wearing something previously worn by someone else. The cost of buying commercial goggles or face shields for each individual student would be prohibitive in most schools.

In order to arrive at some satisfactory solution to this problem, and at the same time provide a project through which the pupils will realize definite instructional benefit, we have designed a face shield that is economical to make and a very effective device from the standpoints of both safety and student activity. In use, this face shield is quite comfortable for all boys including those who must wear glasses. Each student constructs his own face shield, or if desired a limited production system may be used, since this project is ideally suited for just such a procedure. Each boy will have a completed face shield to wear during his shop activities, and something valuable to take home at the end of the school term. The cost of materials is negligible when the increased safety provided is taken into consideration. In fact, the actual cost is less than fifty cents, and nearer to 35 cents if any great quantity is to be made.

The completed safety face shield

From the standpoint of student interest, this has been one of the best projects I have had my classes make during the past 15 years. The fact that the students are interested in making the shields is also one of the best indications that they will actually use them when needed, and often when it is not essential to wear an eye protective device. The range of age or class seems to make no difference, since the same amount of interest has been shown in twelfth grade as in the seventh grade. I no longer find it necessary to keep repeating, "Put on the safety goggles." The boys generally put the shields on when they enter the shop, and lift the shield up until they find it necessary to use it, when, with a small motion, the shield is moved down in front of the eyes.

For this shield use cellulose acetate, not to be confused with the highly inflammable cellulose nitrate. There are only four pieces of 30 gauge tin plate required, plus 4 reinforcing lugs (which can be made from scrap stock) and 2 3/16 by 1/2 in. brazier head aluminum rivets. The head band is made in two pieces and is fully adjustable to each individual student with provision made for later adjustment as needed.

The following procedure has been found to work out best for either individual or production methods.

LIST OF MATERIALS

Part	*Req'd.*	*Name*	*Material*	*Size*
1	1	Head band	30 ga. tin plate	1 7/16 x 16
2	1	Adjusting band	30 ga. tin plate	1 5/16 x 9
3	1	Shield holder	30 ga. tin plate	1 x 1 3/4
4	1	Shield retaining band	30 ga. tin plate	1/2 x 8
5	4	Reinforcing lugs	30 ga. tin plate	From scrap
6	1	Plastic shield	Cellulose acetate	.030 x 6 3/4 x 4 1/4 or 6 1/4 as desired
7	2	Rivets	Aluminum	Brazier head 3/16 x 1/2

Procedure

PART ONE — HEAD BAND

1. Lay out and prick punch centers for 1/8-in. holes.
2. Notch all four corners 3/16 in. by 45 deg.
3. Set bar folder 5/32 in., not quite closed lock, so that the fold is rounded rather sharp, and fold both edges up 180 deg. in the same direction.
4. Using 1/4-in. beading rolls, form a bead the entire length of Part 1. This bead should be on the same side of the stock as the hems. See section *AA*.
5. Place the bead in the wiring groove of the forming rolls and roll to approximately 3 1/2-in. radius.
6. Punch two holes previously located with 1/4-in. hand punch.
7. Using special punch and hardwood block, see *X* in Figure 1, dimple head band at the holes in order to clear the rivet head on the inside and the shield holder over the hems on the outside. This will also enlarge the 1/8-in. holes so that a 3/16-in. rivet may be used. See section through riveted joint.

PART TWO — ADJUSTING BAND

1. Lay out and notch all four corners 1/8 in. by 45 deg.
2. Set bar folder for 1/4-in. closed lock and fold both edges 180 deg. in the same direction.
3. Bead 1/4-in. the length of the stock as in Step 4, Part One.
4. Place bead in wiring groove of forming rolls and form to approximately 3-in. radius.

PART THREE — SHIELD HOLDER

1. Lay out centers for holes 3/8 in. from each end of stock and prick punch.
2. Scribe 3/8-in. radii for circles as shown on drawing.
3. Scribe 45 deg. tangents to circles as shown.

The face shield raised, when not required for use

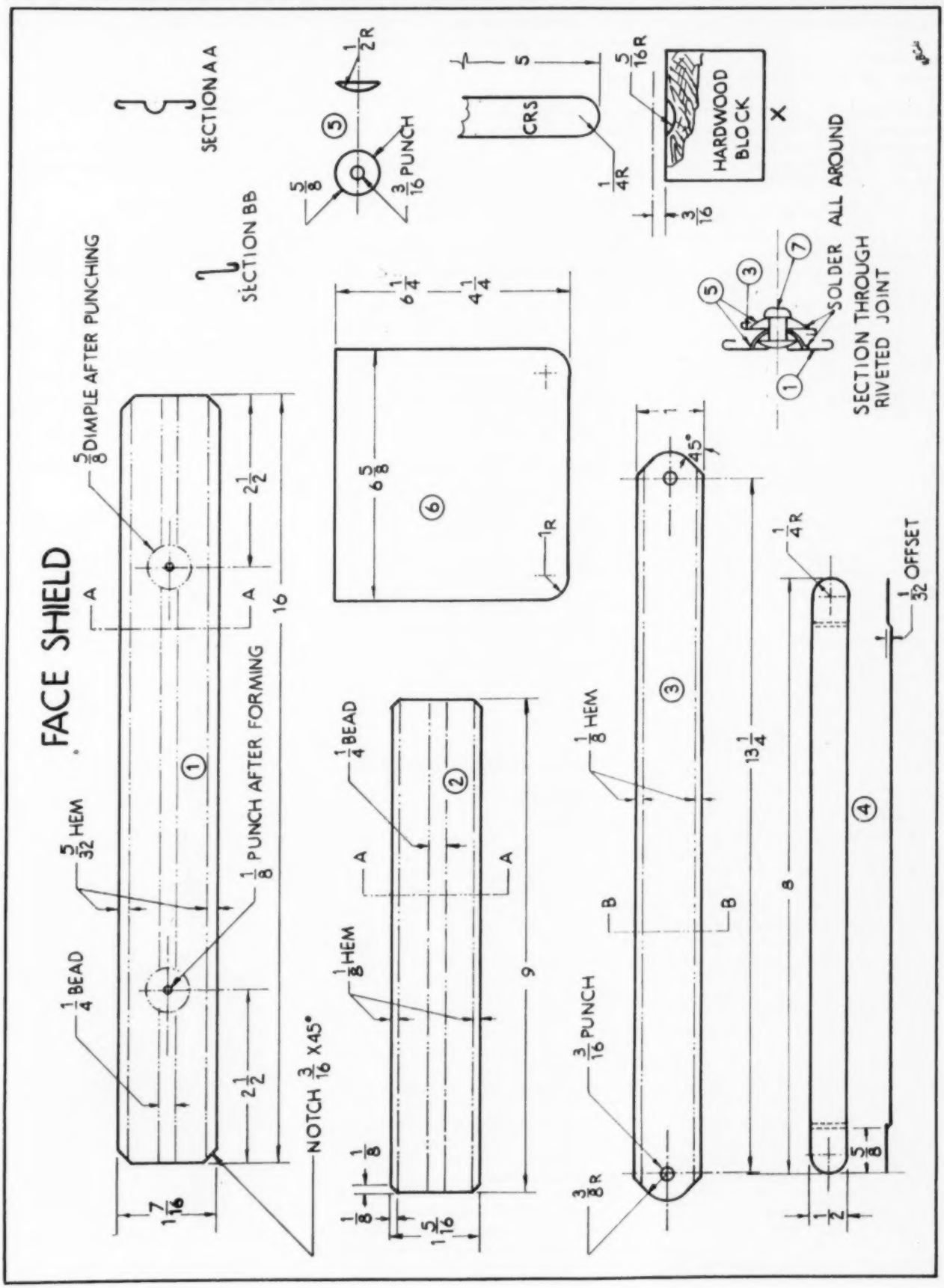


Fig. 1. Details of head and adjusting band

4. Punch 7/16-in. holes, notch and trim as shown.
5. Set bar folder 1/8 in. slightly open lock, and fold edges 180 deg. on opposite sides of stock.
6. Close inside hem.
7. Locate center of stock 7 in. from either end and using dividers, scribe arc 3 5/16 in. on either side of center. These arcs will locate the placement of the shield itself.

PART FOUR — SHIELD RETAINING BAND

1. Measuring in 1/4 in. from each end locate centers for 1/4-in. radius arcs.
2. Measure in 5/8 in. from each end and square line across stock.
3. Cut out arcs on each end of the band.
4. Hold strip with square nose pliers so that edge of pliers is on squared line, and bend the band up 90 deg. Move pliers 1/32 in. toward the end of the stock and bend the band down, making a clean, sharp offset. Repeat on other end. See detail of Part 4.

PART FIVE — REINFORCING LUGS

1. Lay out 5/8-in. diameter circles on scrap stock, prick punching the center of each (four pieces required).
2. Punch 3/16-in. hole in center of each.
3. Place on lead block and punch out circle with 5/8-in. hollow punch. This will raise the lug as shown in detail of Part 5 in Figure 1.

PART SIX — PLASTIC SHIELD

NOTE — This may be 6 5/8 in. by either 4 1/4 or 6 1/4 in. as desired.

1. Using a template 2 in. in diameter, scribe arcs tangent to the sides and bottom edge.
2. Cut out the arcs with sharp tin snips.

NOTE — If a production setup is used the following operations should be done individually.

ASSEMBLY

1. Dimple two of the reinforcing lugs (5) with the special punch and hardwood die, see detail of Part 5, and solder these in place over the dimples formed on the head band. Make certain that the holes in the lugs line up with those in the head band. If necessary the rivets may be inserted through both of these pieces to insure perfect alignment.
2. Solder the other two lugs (5) over the holes in each end of the adjustable shield holder (3), making certain to line up both holes. These lugs should be soldered onto the side of the holder which still has an open hem.
3. Slip adjusting band (2) into hems of head band (1) and adjust to shape and size of head. It may be necessary to open the hems in the head band (1) from the holes to the ends in order that the adjusting band will enter freely. NOTE — This fit may be further adjusted by increasing or decreasing the depth of bead on adjusting band (2).
4. After determining correct shape and size, solder one end of adjusting band (2) to head band (1), and tighten the hems on the other end in order to provide a snug sliding fit to allow for later adjustment. We have found that if the hems are tightened correctly, the size will be maintained securely by the fit of the hem over the adjusting band.
5. Place the shield holder (3) in the forming rolls with the open lock in the wiring groove and form to approximately 4-in. radius.
6. Tin both ends of the retaining band (4). Place one offset on the 3 5/16-in. arc on the shield holder (3) and sweat in place aligning bottom edge with the bottom edge of the shield holder.
7. Insert top of plastic shield (6) under hem of adjusting band (3) and retaining band (4). Pull retaining band (4) tightly over plastic shield (6) and sweat the other end of the retaining band to the shield holder.
8. Tighten hem of shield holder (3) on plastic shield (6) with a mallet. Form the completed unit so that the ends of the shield holder (3) will fit up to the dimples on the head band assembly, thus further tightening the retaining band (4) on the plastic shield (6).
9. Place brazier head rivets through the holes in the head band assembly with the heads fitting into the dimples. Place the holes in the shield assembly over the rivets, set lightly, and rivet in place. Tighten rivets only enough to hold the shield assembly up or down. Round rivets with No. 2 rivet set.

NOTE — The head band may be finished, if so desired, with Suede-Tex although we have found that no finish whatever is necessary.

NOTE — The Cellulose Acetate Shield is Kodapak which comes in sheets 20 in. by 50 in. and is available from Cadillac Plastic Co., 15115 Second Ave., Detroit 3, Mich.

COLONIAL MAGAZINE LAMP

H. V. JOHNSON
Senior High School
Canton, Ill.

There seems to be a great demand for the Colonial type of furniture in our homes today. Some people like to revive old furniture and some prefer the newer adaptation by our furniture designer of today. The magazine lamp described in this article fits in nicely with any Colonial type of interior decoration. This lamp has a dual use. It not only serves as a lamp but has a convenient receptacle for books and magazines.

An inspection of the drawing will reveal the fact that its construction is fairly simple. The base is constructed of 3/4-in. material, 11 1/4 in. wide and 18 1/2 in. long. The bottom should be cut to shape upon the band saw. Four 3/4-in. holes are then bored for the legs. A jig for boring these holes, all the same size, can be made of a block of wood.

Two mortises 3/8 by 3/8 by 6 in. can be made in the bottom to accommodate the side pieces.

The side pieces are made of 3/4-in. material. Draw 1-in. squares upon a piece of cardboard and draw the outline of the sides as shown.

The back piece and center piece are made the same way.

The upright is constructed of a piece of stock 1 1/2 in. square and 46 3/4 in. long. Rabbet out a piece 5/8 by 12 in. in the bottom of the upright. In assembling the lamp the rabbet will fit into the back piece.

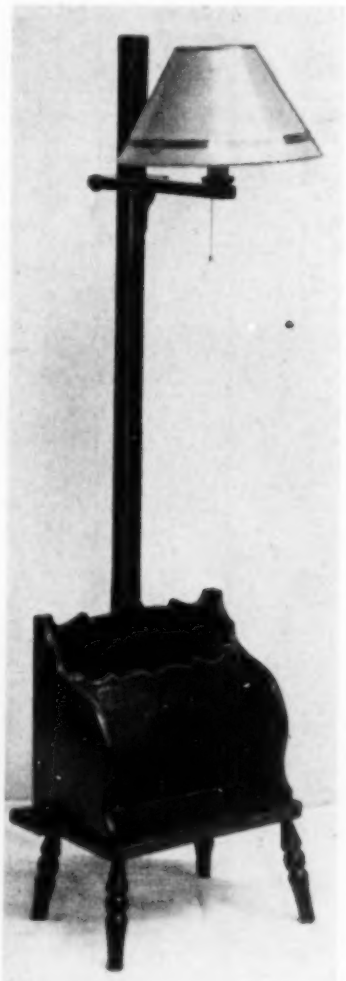
A pattern also has to be made for the shade support. This shade support is a movable support and it is necessary that the support slides easily up and down the column.

A bracket is made and fastened to the shade support and acts as a brace.

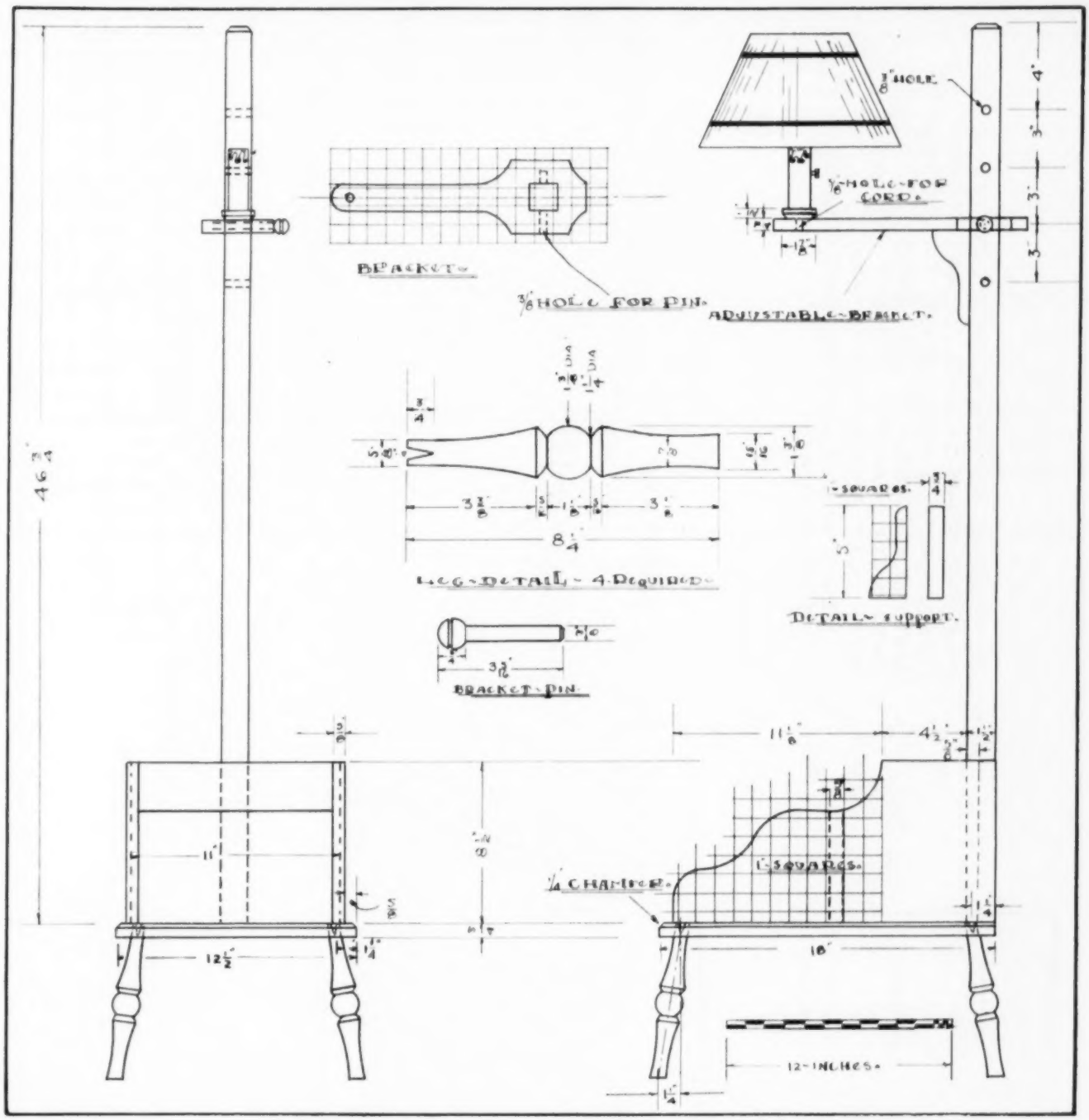
A candle cup is turned and fastened to the shade support. Five 3/8-in. holes are bored in the column. The first hole is 2 1/2 in. from the top of the column and the other four are 2 in. apart. A pin is turned to fit these holes so that the support may be moved up and down and held in place with the pin.

The lamp may now be assembled by gluing the legs into the bottom. The sides, back and center section may then be assembled with glue and brads. Fasten the column to the back with 1 1/4-in. flathead screws.

The lamp may then be wired and finished to suit.



Colonial magazine lamp



Drawing of the colonial magazine lamp showing the construction details

BILL OF MATERIALS

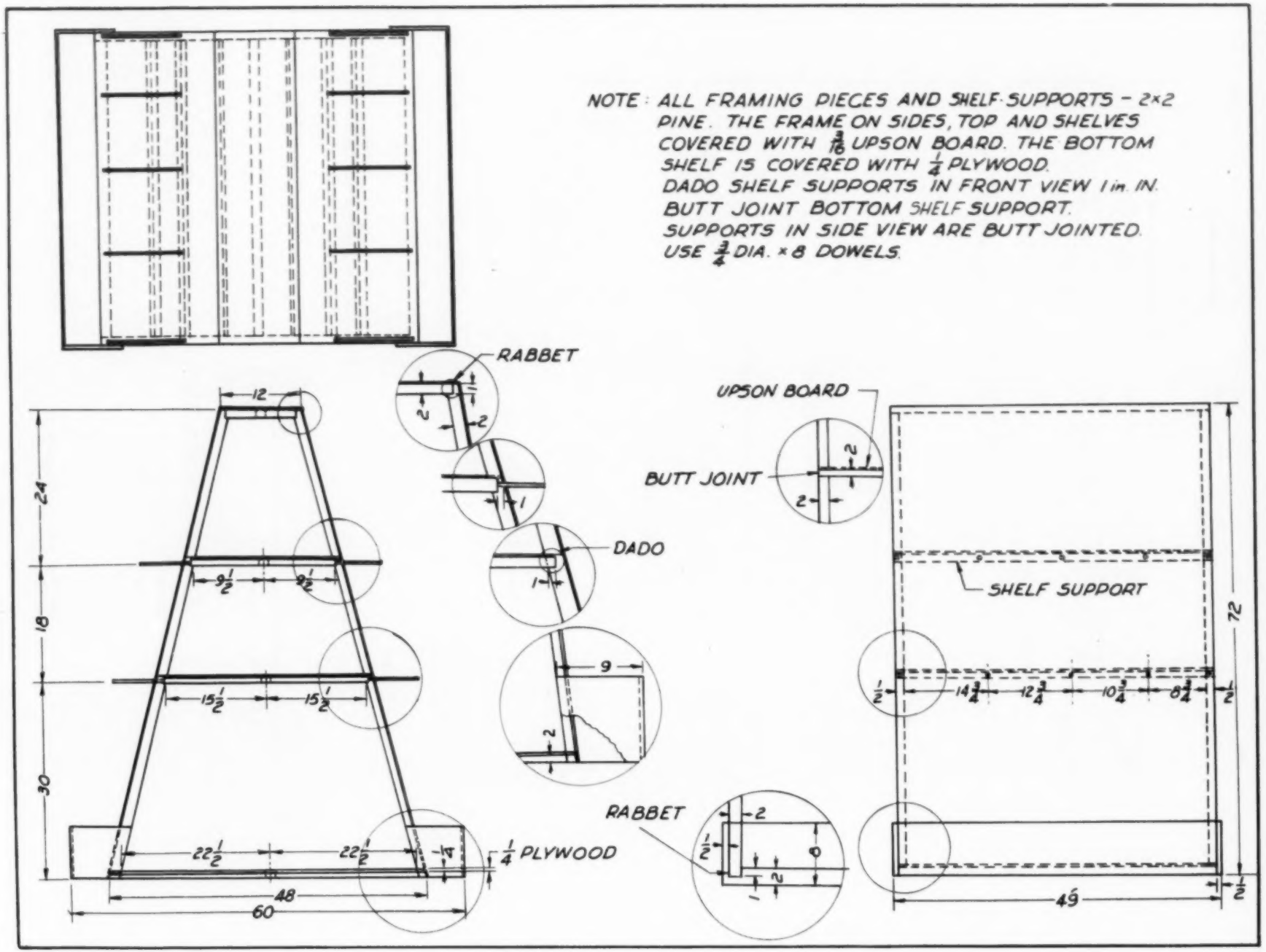
No. of Pieces	*Part*	*Size*
1	Column	1½ x 1½ x 46¼
4	Legs	2 x 2 x 9
1	Bottom	¾ x 13 x 18½
1	Back piece	⅝ x 9 x 12¾
2	Sides	⅝ x 9 x 12
1	Center	⅝ x 7 x 12¾
1	Shade support	¾ x 1½ x 13½
1	Bracket	¾ x 1½ x 3
1	Candle cup	⅝ x 2 x 2
1	Pin	1 x 4¼

A HANDY WOOD RACK

RICHARD O. VEDRINES
Industrial Arts Instructor
High School
Jeanerette, La.

The illustration accompanying this article shows a wood rack, the design of which was taken from the Mobile Tool Unit by LeRoy Rowand, shown on page 269 of the October, 1953, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION.

For some time the author had been concerned over the amount of floor space needed to store wood. My wood rack was 4 ft. high, 4 ft. wide, and 8 ft. long. It was necessary to leave a clear area on both ends to remove stock. This took up about 64 sq. ft. of floor space.



Detailed drawing of the wood rack

The rack illustrated here takes up about 24 sq. ft., is easier to get to, and if placed with the back to a wall, plywood may be stored between the rack and the wall. The drawing was made by Harry Chris, first year industrial-arts student, tenth grade, Jeanerette High School.

Farmers and ranchers, who hold 15 per cent of the total number of aircraft in this country, use their petroleum-powered planes in various ways, from checking fences or spraying crops to chasing birds from the fields. — *Petroleum Newsnotes*

There are more than 12,000 independent companies engaged in the production of crude oil in this country. These include oil and gas field contract services, and companies producing crude petroleum, natural gasoline, and natural gas. — *Petroleum Newsnotes.*

PROLONGING THE USE OF DISCARDED DRAWERS

RICHARD HUTCHINS
Ward Senior High School
Westerly, R. I.

Classrooms always have the problem of providing storage space for filing lesson material and the like. This problem may be solved by attaching drawers from cabinets that have been discarded to procure sufficient depth for upright filing.

This procedure is carried out by removing the drawers taken from the discarded cabinets and attaching them on top of each other. In the case under discussion, the drawers used were deep enough to require only two. Remove the drawer slide that supports the top drawer; also remove the bottom of the top drawer. The removed drawer slides can supply material for the needed shims. Cut the needed shims and drill ¼ to ⅜-in. holes 8 in. apart through the shims and into the bottom of the top drawer and into the top of the bottom drawer about 2 in. deep. Then place dowels to fit the holes and glue and clamp the two drawers together.

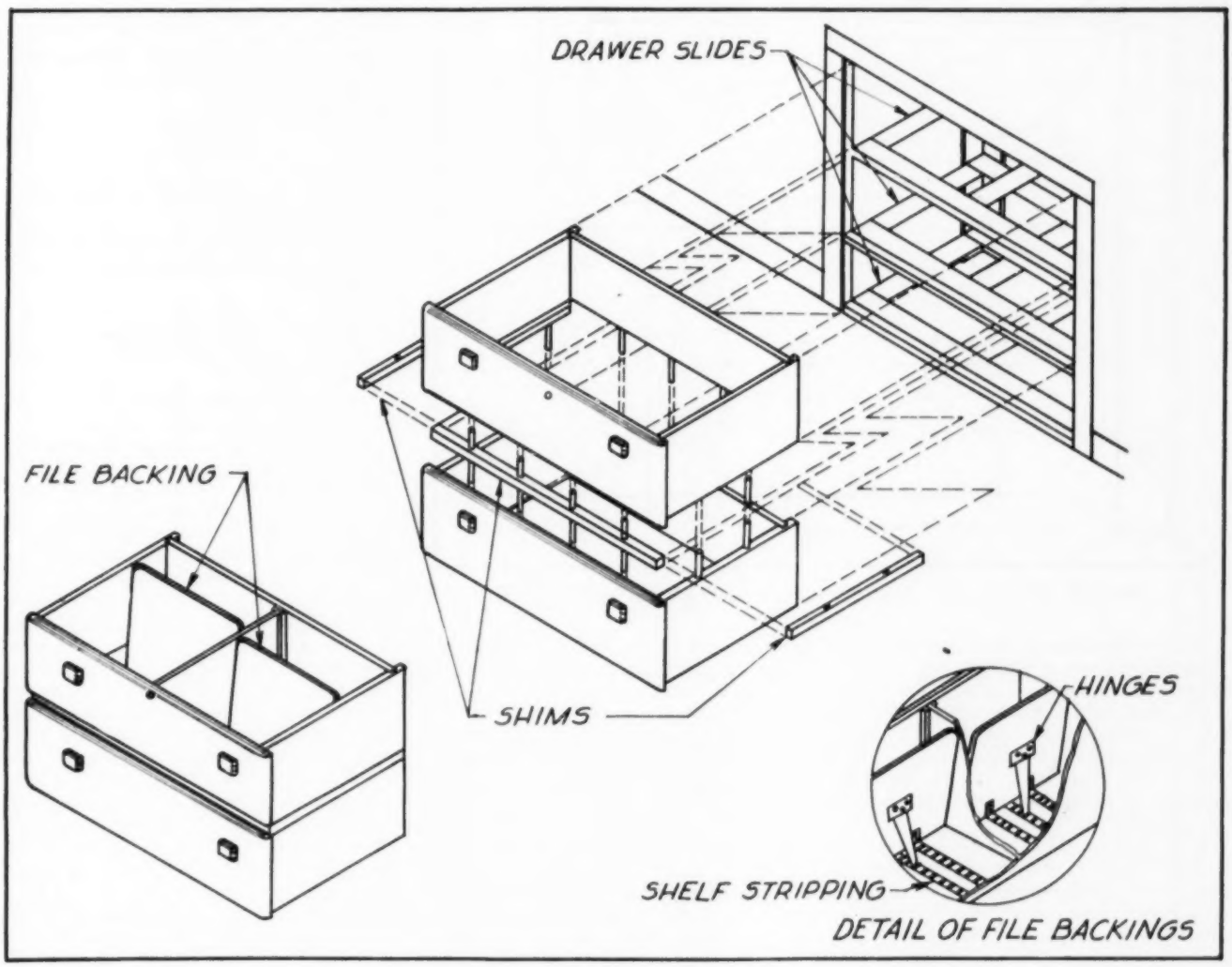
After the glue is dry, the drawer may be divided off and file backings can be made from the removed bottom (of the former top drawer). Secure a pair of *T* hinges and enough shelf stripping for the number of file backings.

This project will supply extra filing space and will not take up any floor space, thus making it an inexpensive and efficient way of using salvaged material.

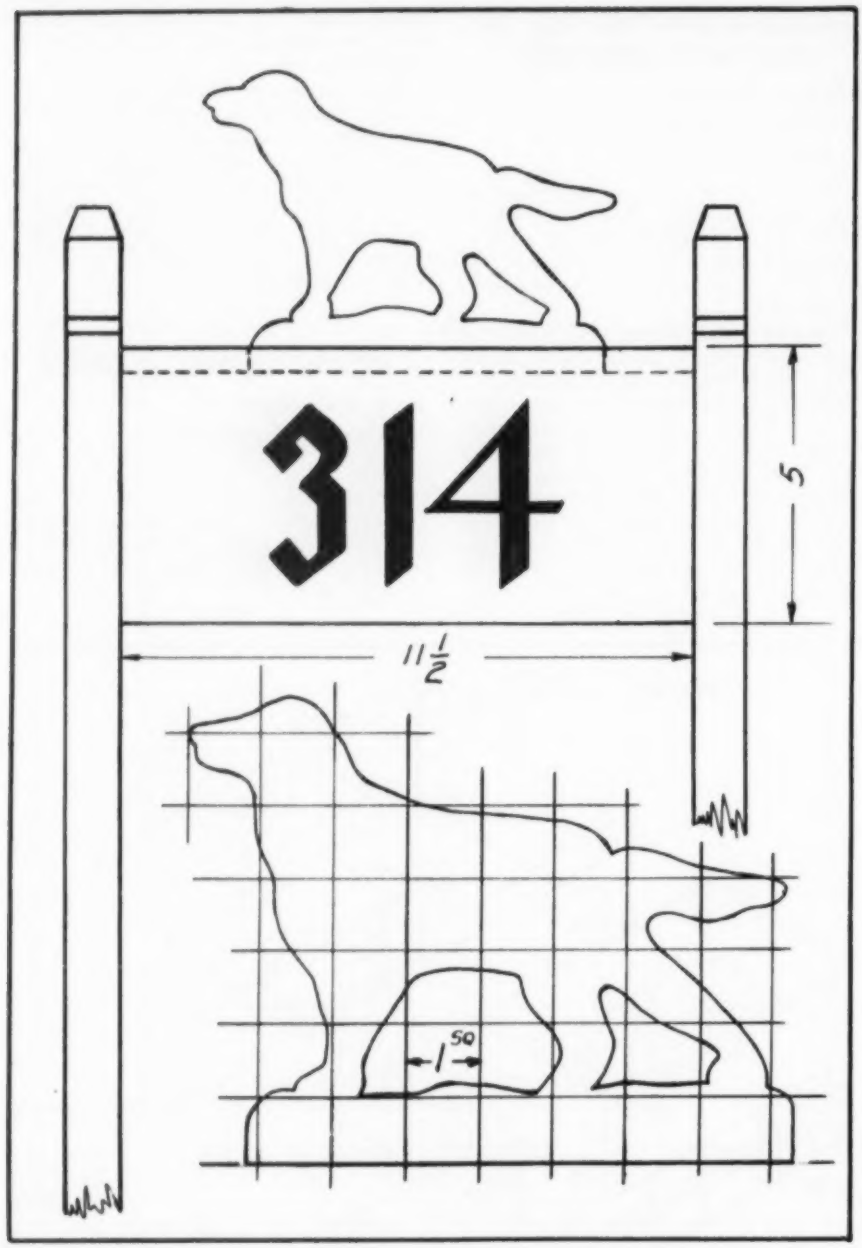
HOUSE NUMBER MARKER

J. W. BOLLINGER
Roosevelt Jr. High School
Tulsa, Okla.

Just about every home in the U.S.A. has an address, so that a house number marker for the front lawn like the one shown, should be of interest to a large number of woodwork students.



Putting useless drawers to work



Detailed drawing of the house number marker for the front lawn

The *posts* used on the one shown are ¾ by 1¼ in., with length to suit. The top ends are suitably ornamented.

The *board for the numbers* is ¾ by 5 by 11½ in., and is fastened to the posts by means of wood screws and dowel pins.

The *setter silhouette* is cut out of ¼-in. weatherproof plywood. It is glued in place in the groove cut to receive it.

The assembled job, after careful sanding, is given two coats of shellac, and then two or three coats of good outside paint.

The *numbers* are cut out of ¼-in. weatherproof plywood. They are then sanded, shellacked, and painted with outside paint either medium green or medium blue color. Then they are nailed in place with escutcheon pins.

For best results, set the posts in a bed of coarse cement.

A CRYSTAL RADIO

L. LYLE BAKER
Dallas, Tex.

Remember the popularity of the crystal radio back during the 1920's? Perhaps you remember also the annoyance of trying to maintain a "cat-whisker" contact with a sensitive spot on a little piece of galena in order to detect radio signals. The use of modern fixed crystals such as the 1N34 diode has eliminated critical detector adjustments and has simplified the construction of crystal radio receivers. The use of a diode in a crystal set tends to guarantee the performance of the set and it helps to promote the builder's interest. Satisfaction becomes more fully realized by a pupil when the project which he builds actually works.

Here is an interesting model of a modern crystal radio which a junior high school pupil might enjoy building. This particular crystal set seems to have possibilities as a general-shop project since its construction involves work in design, layout, squaring stock, mortising, plastics, wiring, soldering, and finishing.

LIST OF MATERIALS

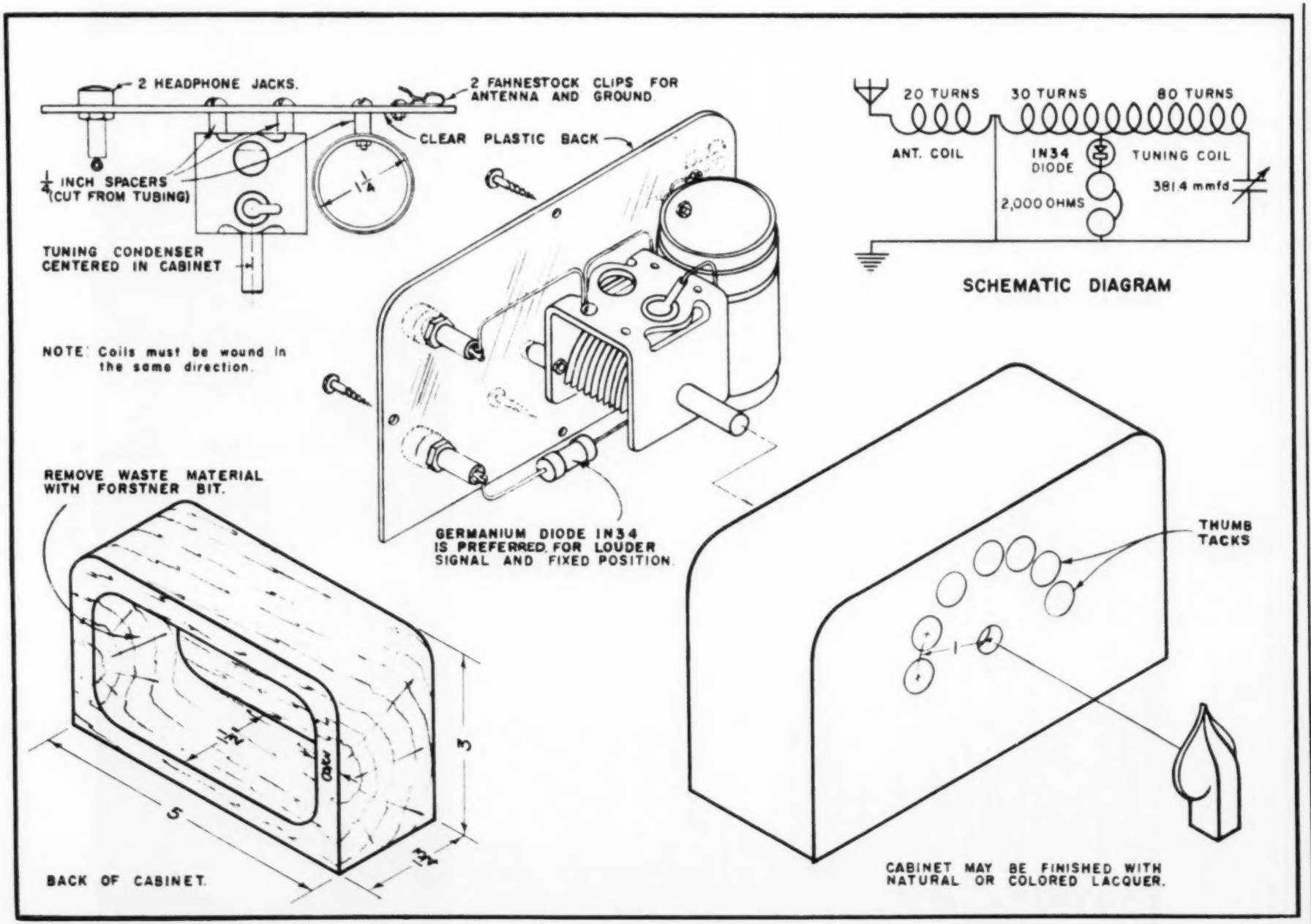
1 piece of wood approximately 1¾ by 3 by 5½ in.
1 piece clear plastic 1/16 by 3 by 5½ in.
1 midget 27 plate variable condenser about 365 mfd.
1 knob for ¼-in. shaft
2 phone jacks
2 Fahnstock clips or binding posts
1 Germanium diode No. 1N34 crystal detector
1 cardboard tube or wooden dowel 1 to 1¼ in. dia. by 2 in. long
30 feet No. 32 enameled copper wire
7 thumbtacks
Assorted screws and bolts for mounting parts
Hook-up wire and resin core solder
1 antenna kit
1 pair 2000 ohm headphones

Procedure

1. Design, lay out, and cut stock to size.
2. Mortise back of block to within about ¼ in. of face of block.
3. Drill 5/16-in. center hole in face of block.
4. Wind coil and provide taps at 20 turns and 30 turns.
5. Drill plastic panel and mount parts.
6. Wire set and solder connections.
7. Finish cabinet and insert thumbtacks using 1-in. radius.
8. Assemble panel in cabinet.
9. Attach antenna, ground, and phones.

When constructing radios, experiments are usually in order, such as the use of different sized coils, wiring diagrams, mounting parts, etc. The builder of this set should consider it no exception. For example, instead of using a coil with taps as shown in the schematic diagram, try using a coil with no taps and simply connect the diode 1N34 to the antenna end of the coil. Sometimes a good local signal can be received when using only a make-shift antenna and no ground. As an experiment try connecting a wire from the antenna clip on the crystal set to the finger-hook on a dial telephone or perhaps to some bedsprings. Each of the devices will serve as an antenna. Crystal radios are intended to receive local broadcast signals only. However, with the use of a high antenna about 100 feet long and a good ground connection, it is often possible to receive signals from transmitters several miles distant.

This project was designed by the writer while doing graduate work in industrial arts at North Texas State College, Denton, Tex. The course, directed by Leslie Sorrells, pro-


2 HEADPHONE JACKS.
2 FAHNESTOCK CLIPS FOR ANTENNA AND GROUND
CLEAR PLASTIC BACK
¼ INCH SPACERS (CUT FROM TUBING)
TUNING CONDENSER CENTERED IN CABINET
NOTE: Coils must be wound in the same direction.
20 TURNS
30 TURNS
80 TURNS
ANT. COIL
IN34 DIODE
TUNING COIL
2,000 OHMS
381.4 mmfd
SCHEMATIC DIAGRAM
REMOVE WASTE MATERIAL WITH FORSTNER BIT.
GERMANIUM DIODE IN34 IS PREFERRED FOR LOUDER SIGNAL AND FIXED POSITION
THUMB TACKS
BACK OF CABINET.
CABINET MAY BE FINISHED WITH NATURAL OR COLORED LACQUER.

The construction of this crystal radio set involves work in design, layout, squaring stock, mortising, plastics, wiring, soldering, and finishing

vided supplementary teacher preparation through the development of instructional aids and projects in order that teachers might be better prepared to offer secondary pupils a richer program in industrial arts. (Drawings by Fritz Roberson, N.T.S.C.)

OBSERVING YOUR VISUAL AIDS PROGRAM

HAROLD HAINFELD
Roosevelt School
Union City, N. J.

Industrial-arts teachers on the elementary school level are frequently the only men teachers in the building. Because of his mechanical ability and knowledge of electricity, the industrial-arts teacher is often in charge of the school projector and the student projection squad. While not necessarily responsible for requisitioning the films that are shown as part of the audio-visual program, he is usually called upon to train the student operators of motion picture equipment.

With an interest in photography, the industrial-arts teacher can aid in evaluating student interest in the film materials being shown. It is possible to photograph your pupils watching educational motion pictures without their knowing it.

One method is to use infra-red photography which was developed for certain types of air photography by the air force during World War II. Infra-red film is used instead of the familiar pancromatic type. This film is sensitive to the invisible infra-red rays. A No. 22 infra-red bulb is also used. This bulb resembles a regular flash bulb, except that it is coated with a purple-black lacquer that permits only these invisible infra-red rays to go over the area. The bulb flashes, as would the regular bulb, but nothing is seen by the audience.

The illustrations shown were taken with an Argus C-3, 35mm. camera, with a lens opening of f 3.5 and a shutter speed of 1/50th second. With infra-red film, focus is not the same as with regular pancromatic film. An area 20 feet from the camera can be photographed, but due to the short length of the rays, a distance of 25 feet must be set on the camera to have the pictures come out in focus.

Large camera stores will usually have a small stock of infra-red film and bulbs or will be glad to get some for you. Cost of film and bulbs is slightly more than regular flash bulbs and 35mm. film.

Another possibility to observe the effectiveness of the film program is to use time-lapse photography. In this case the familiar Super-XX fast film is used. The reflected light from the screen is used as the source of light. In the illustration, a lens opening of f 5.6 was used with a time exposure of 2 seconds. After the lights in the room were turned off, and the film started, the camera, mounted on a tripod was set on the table next to the screen where the speaker was placed. It is usually not satisfactory to take pictures at greater than 1/25th second with the camera being held in the hand. It is too unsteady and the picture becomes blurred. A cable release was used and a clear picture resulted.

At 1/50th second and infra-red film, action is stopped. Student faces can show interest or lack of interest with eyes closed. Bright flashes do not blind them and cause them to blink. With one flash bulb, much clearer pictures will result, but student interest is on the photographer and not the film. With time-lapse photography, lack of interest can be detected by movement of individual students.

Of 45 students and two teachers viewing the film, only three knew the pictures were being taken. They noticed the reflector on the camera while taking the infra-red pictures. The teachers, seeing the film for the second time, did not notice the photographic activities.

Evaluation of teaching materials is an important phase of utilization. It is almost impossible to observe student actions when they are viewing a motion picture in the darkened visual aids room. You, too, may find that when films are well selected, student interest is keen. The use of infra-red and/or time photography will enable those responsible for the use of visual materials, to evaluate their visual aid offerings more fully.

A PORTABLE JIG SAW

PAUL R. MOORE
Industrial-Arts Department
Clark Junior High School
East St. Louis, Ill.

Boy interest projects may be classified in two groups. The first of these are those projects which the boy makes for someone else, or for home use. The second group, which is considerably smaller than the first, are those projects which have primary appeal to the boy because he has a personal need and use for them. The writer has found from experience the portable jig saw belongs to this group. Because of its personal appeal most boys consider it a very desirable project for the general metal shop.

While this jig saw is easy to make, it also presents a challenge to the average ninth-grade boy as it involves simple mathematics, reading a working drawing, and a certain degree of skill in the use of numerous power machines and hand tools.

This project also has teacher appeal because it satisfies many industrial-arts objectives, tends to develop initiative and imagination, and covers a diversity of areas and processes. The parts of the project are made in the following areas: woods, machining, bench metal, and forging.

Machines and equipment: drill press, engine lathe, table saw, grinder, power hack saw, and gas furnace. Spraying equipment may be used if available.

Hand tools: ruler, framing square, try square, T bevel, plane, file, drills, taps, reamer, hack saw, scriber, adjustable wrench, screw driver, center punch, ball-peen hammer, and rivet set.

Are they interested in the visual aids?

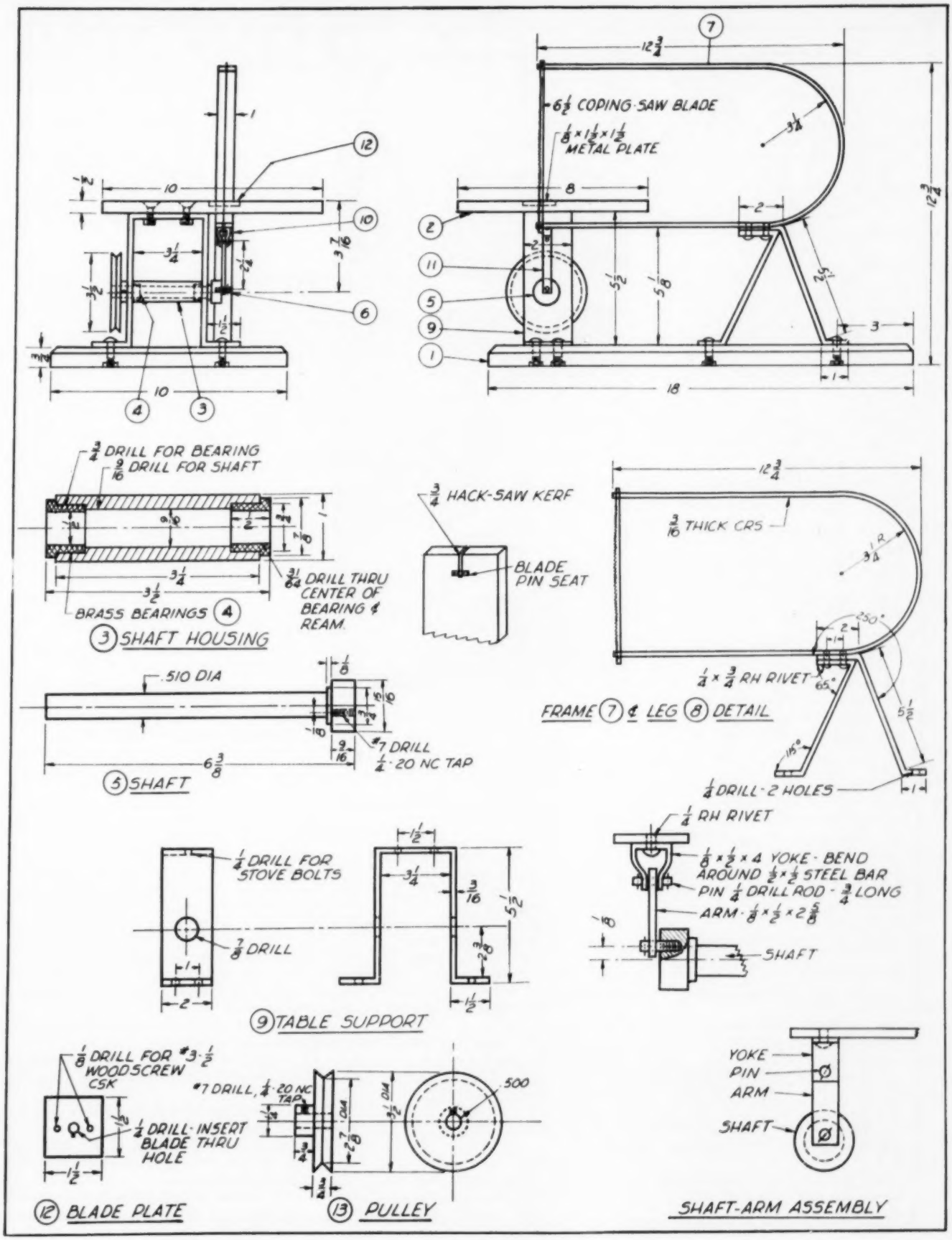


Fig. 1. Details of the portable jig saw

BILL OF MATERIAL

Part No.	No. of Pcs.	Name	Material	Dimension in Inches
1	1	Base	Plywood	¾ x 10 x 18
2	1	Table top	Plywood	½ x 8 x 10
3	1	Housing	Rd. C.R.S.	1 x 4
4	1	Bearings	Rd. brass rod	¾ x 1⅛
5	1	Shaft	Rd. C.R.S.	1 x 6⅜
6	3	Pins	Drill rod	¼ x ¾
7	1	Frame	Cold rolled steel	3/16 x 1 x 30
8	2	Legs	Cold rolled steel	3/16 x 1 x 8⅝
9	1	Table support	Cold rolled steel	3/16 x 2 x 17½
10	1	Yoke	Band iron	⅛ x ½ x 4
11	1	Arm	Band iron	⅛ x ½ x 2⅝
12	1	Blade insert	Cold rolled steel	3/16 x 1½ x 1½

Procedure

Woods Area

Base — 1

1. Select ¾-in. plywood stock for base.
2. Square stock to ¾ by 10 by 18.
3. Lay out and plane ¼-in. chamfer on ends and edges of base.
4. Sand surfaces with No. ½ sandpaper.

Table top — 2

1. Select ½-in. plywood stock for table top.
2. Square stock to ½ by 8 by 10.
3. Sand surfaces with No. ½ sandpaper.
4. Locate and drill holes for blade and table support fastenings.

Bench Metal and Forging Areas

Frame — 7

1. Cut a piece of machine steel 3/16 by 1 by 30.
2. File ends square.
3. Saw a kerf 3/16 in. deep on each end and score ends with chisel. See Figure 1.
4. Shape frame. Use wood form as shown in Figure 1.

Legs — 8

1. Cut two pieces of cold rolled steel 3/16 by 1 by 8⅝.
2. File ends square.
3. Heat ends in gas furnace and bend to proper angle. See Figure 1.
4. Locate and drill ¼-in. holes for rivets.
5. Locate and drill ¼-in. holes in feet for ¼-in. stove bolts.

Table Support — 9

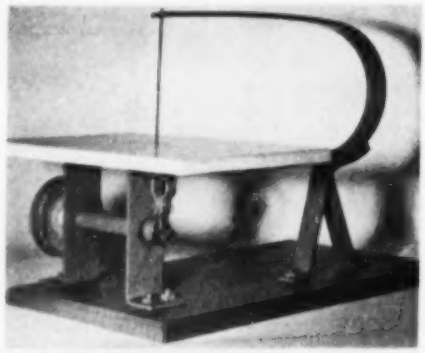
1. Cut a piece of cold rolled steel 3/16 by 2 by 17½.
2. File ends square.
3. Lay out for bending as shown in Figure 1.
4. Heat and bend. Bends must be square.
5. Locate holes and drill for ¼-in. stove bolts. See Figure 1.
6. Locate and drill ⅞-in. holes for housing. See Figure 1.

Yoke — 10

1. Cut a piece of band iron ⅛ by ½ by 4.
2. Square ends and form according to drawing.
3. Locate and drill ¼-in. holes for pin.
4. Locate and drill ¼-in. rivet hole.

Arm — 11

1. Cut a piece of band iron ⅛ by ½ by 2⅝.
2. Square ends and drill ¼-in. hole for top pin only. Second hole will be drilled when length of stroke has been determined.



A portable jig saw

Blade Insert — 12

1. Cut plate 3/16 by 1½ by 1½ from cold rolled steel.
2. Square with file.
3. Locate, drill, and countersink two holes for ½-in. No. 6 f.h.b. wood screws.

Machining Area

Housing — 3

1. Cut stock 4 in. long for shaft housing from 1-in. round cold rolled steel.
2. Face ends to proper length.
3. Shape ends to fit ⅞-in. holes in the table support.
4. Drill ¼-in. pilot hole through housing. Drill from each end.
5. Drill 9/16-in. shaft hole through housing. Drill from each end.
6. Drill a ¾-in. hole ½ in. deep in ends of housing for the brass bearings.

Bearings — 4

1. Cut stock 1⅛-in. long from ¾-in. brass rod.
2. Face ends.
3. Drill 31/64-in. hole through rod.
4. Ream hole with ½-in. reamer.
5. Saw 1⅛-in. length in half, making two ½-in. bearings.

Shaft — 5

1. Cut stock for shaft from 1-in. round cold rolled steel.
2. Face ends and countersink with countersink drill.
3. Turn shaft according to dimensions on drawing allowing ⅜-in. waste on each end.
4. Hack saw waste on large end and face to 9/16-in. length. See drawing.
5. Locate, drill (No. 7 drill), and tap hole for ¼-in. arm pin. Location will determine length of stroke, about ⅛ in. off center.

Pins — 6

1. Cut ¾-in. upper arm pin from ¼-in. drill rod.
2. Drill holes for cotter pins.
3. Cut lower arm pin ⅞ in. long from ¼-in. drill rod.
4. Cut ¼-in. threads on one end.
5. Drill hole for cotter pin.

Assembling and Finishing of Project

1. Locate and drill two ¼-in. rivet holes in the frame and rivet the two legs to the frame.
2. Locate and drill ¼-in. holes in the wood base for the table support and legs. Attach the table support and frame to the base with ¼-in. stove bolts.
3. Find location of blade insert on the table top and chisel out the area thus making plate flush with top area.
4. Attach table top to the top of the table support with ¼-in. flat head stove bolts.
5. Drill and tap a ¼-in. hole in large end of shaft ⅛ in. off center. This gives saw ¼-in. stroke.
6. Assemble shaft housing and bearings in ⅞-in. holes in table support.
7. Insert shaft in housing and attach 3½-in. V pulley to the shank end.
8. Rivet the yoke to the end of the frame and attach arm and pins with cotter pins.
9. Insert a 6½-in. coping saw blade in kerfs in ends of frame. Blade seat is made by specially ground chisel.
10. Hook saw to ¼ h.p. motor for trial run.
11. Make necessary adjustments after trial run.
12. Finish base, frame, and table support with vista green machine enamel. The table top may be finished with either light yellow or focal ivory enamel.

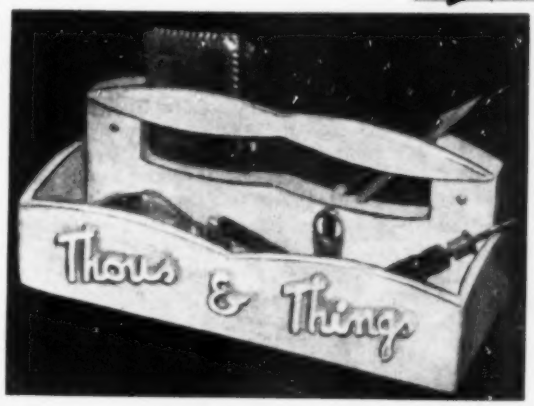
Precautions

1. Bend frame at proper arc to maintain blade tension.
2. Use T bevel to check angles when bending leg pieces.
3. A piece of ½-in. steel may be used in bending the yoke.
4. Do not drill holes in the table support until all bends have been made, and the angles squared.
5. Drill leg holes in base before locating table support holes.
6. If the first pin hole in the shaft does not give the correct stroke, locate, drill, and tap another hole.
7. Oil holes may be drilled through housing and bearings to give proper lubrication.
8. Measure twice before sawing, bending, or drilling.

NITE SHELF

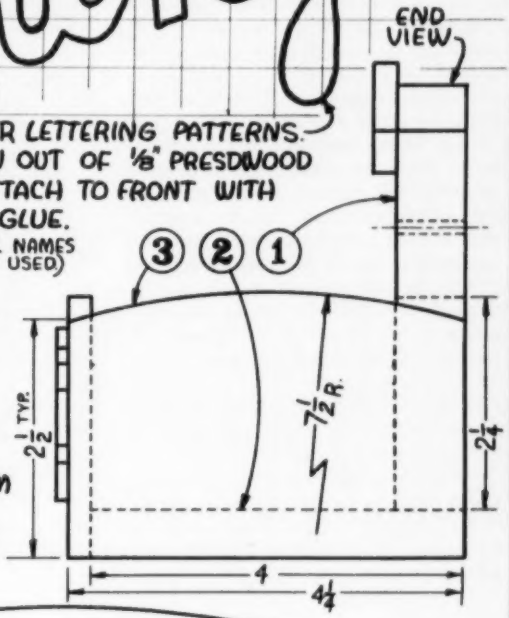
TO HOLD A *Thousand Things*.... FOR MAN OR BOY

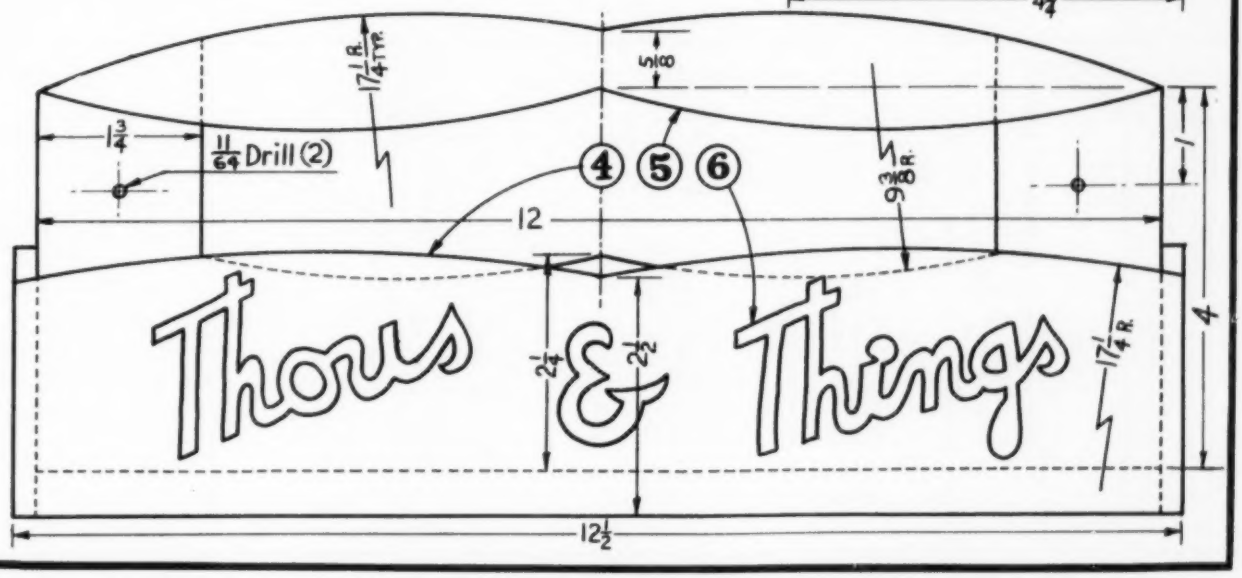
Thous & Things



FINISH: ANTIQUE; BROWN OVER WHITE PAINT.

1. BACK. ¾" STOCK. DRILLED FOR FASTENING TO WALL WITH #8 R.H. SCREWS OR MOLLY FASTENERS.
2. BOTTOM. ½" STOCK. NAILED TO BACK WITH 4d FINISH NAILS.
3. 2 ENDS. ¼" PLYWOOD. FRONT EDGES MITERED. NAILED TO BACK AND BOTTOM WITH 4d FINISH NAILS.
4. FRONT. ¼" PLYWOOD. ENDS MITERED. NAILED TO BOTTOM WITH 4d FINISH NAILS.
5. RACK. ¼" PLYWOOD. NAIL TO BACK WITH ¾" BRADS.
6. ½" SQ. FOR LETTERING PATTERNS. JIG-SAW OUT OF ⅛" PRESDWOOD AND ATTACH TO FRONT WITH WHITE GLUE. (INDIVIDUAL NAMES COULD BE USED)





Submitted by Stan Schirmacher, Industrial Arts Department, High School, Cottonwood, Ariz.

DUNCAN PHYFE COFFEE TABLE

LeROY W. DRAEGER
Industrial Arts Department
Senior High School
Fond du Lac, Wis.

Duncan Phyfe was apparently the only American to develop a distinctive style of furniture of his own. Like other great designers, he chose from whatever sources he desired and adopted his findings to his own uses, always making some modification of his creation that gave to them individuality.

In his shop at 35 Partition Street, now Fulton, in New York he developed his greatest designs during the years between 1795 to 1818. He became an expert judge of mahogany and as to his ability to use it for furniture he had no superior. It is from this period — 1795 to 1818 — that modes similar to the one found in the coffee table described in this article, were created. It possesses an effective lowness together with excellent proportions and a highly developed purity of line.

In recent years, there has been a revival in Duncan Phyfe furniture. Styles may come and go with the public's fancy, but such furniture as Phyfe's always will be beautiful. Not only is it on a classic foundation of correct proportion but it is inseparably connected with the early history of this country.

This piece has a homelike appeal and offers a challenge to any American boy to use tools and machines in recreating this great artist's conception of mahogany furniture. It also offers an opportunity for the young craftsman to do some hand carving which is lacking in so many of our modern pieces of furniture.

Following are suggested steps in making this coffee table.

The first part, the upright, requires a gluing procedure and should, therefore, be the starting job.

Fig. 5. The fluted upright and the carved legs

The Upright

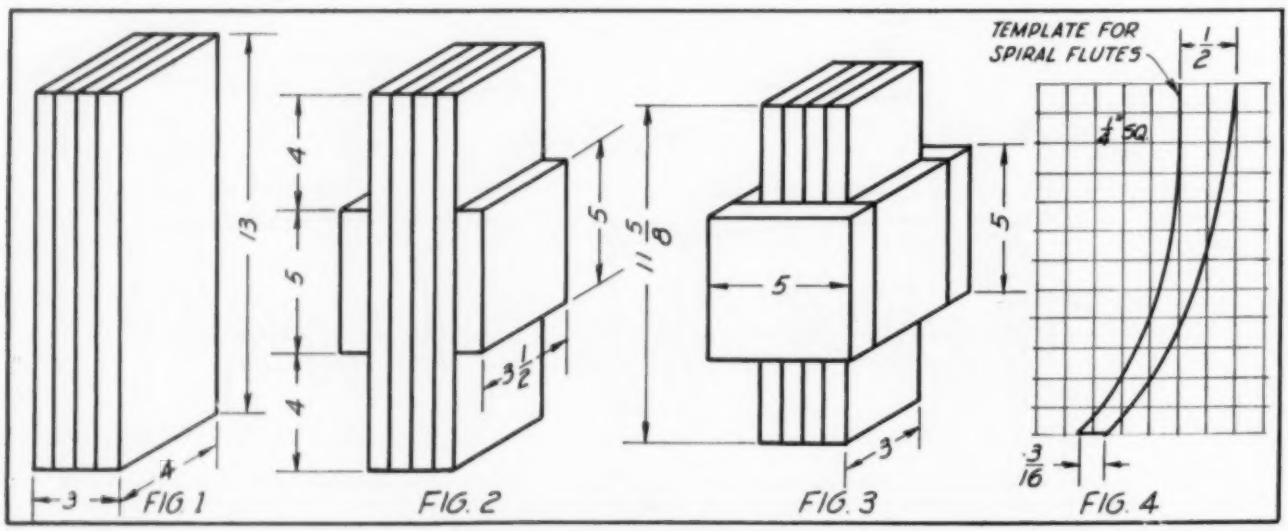
1. Select a piece of mahogany large enough to cut four pieces 1 by 4 by 13 in.
2. Joint the surfaces for gluing as illustrated below.
3. When the glue is dry, scrape off the joints so as not to dull the jointer blades.
4. Joint edges to have the piece measure 3 in. thick by 3½ in. wide.
5. Cut two blocks of mahogany to 1 by 3½ by 5 in. and glue to the faces of the upright as shown in Figure 2.
6. After the glue has dried joint the upright to measure 3 by 3 and square ends to measure 11⅝ in. long.
7. Cut two more blocks 1 by 5 by 5 in. and glue them to the edges as illustrated below.
8. When the glue is dry round off the corners of the blocks to eliminate the possibility of chipping the corners when turning starts.
9. Locate the centers on each end and mount the stock on the wood turning lathe.
10. Turn the upright to the dimensions shown on the drawing.

NOTE: Be sure to turn the 1-in. dowel on the end.

11. When desired shape has been turned out, sand to a smooth finish with No. 3/0 sandpaper.
12. Remove the stock from the lathe and mark off the spiral flutes with the template shown in Figure 4.
13. Carve the flutes with hand carving tools and sand them to finished shape.
14. Lay out and cut the mortised holes.

Making the Legs

1. Cut three pieces of mahogany to 1 by 6 by 13 in. and joint surfaces for gluing.
2. Glue the pieces together. When dry scrape off excess glue.
3. Resaw to secure two pieces approximately 1⅛ by 6 by 18 in.
4. Draw the leg template on these pieces so as to secure four legs.
5. Saw the legs to shape on the band saw.
6. Work the edges of the legs to the finish desired.
7. Plane surface of legs but do not plane taper until tenon has been cut.
8. Lay out and cut the tenon.
9. Plane surfaces to proper taper and form the ends to receive the Duncan Phyfe claw foot as shown.
10. Lay out the design to be carved on each leg and form with the hand carving tools.
11. Sand the carving to the desired finish.



Details of the Duncan Phyfe table

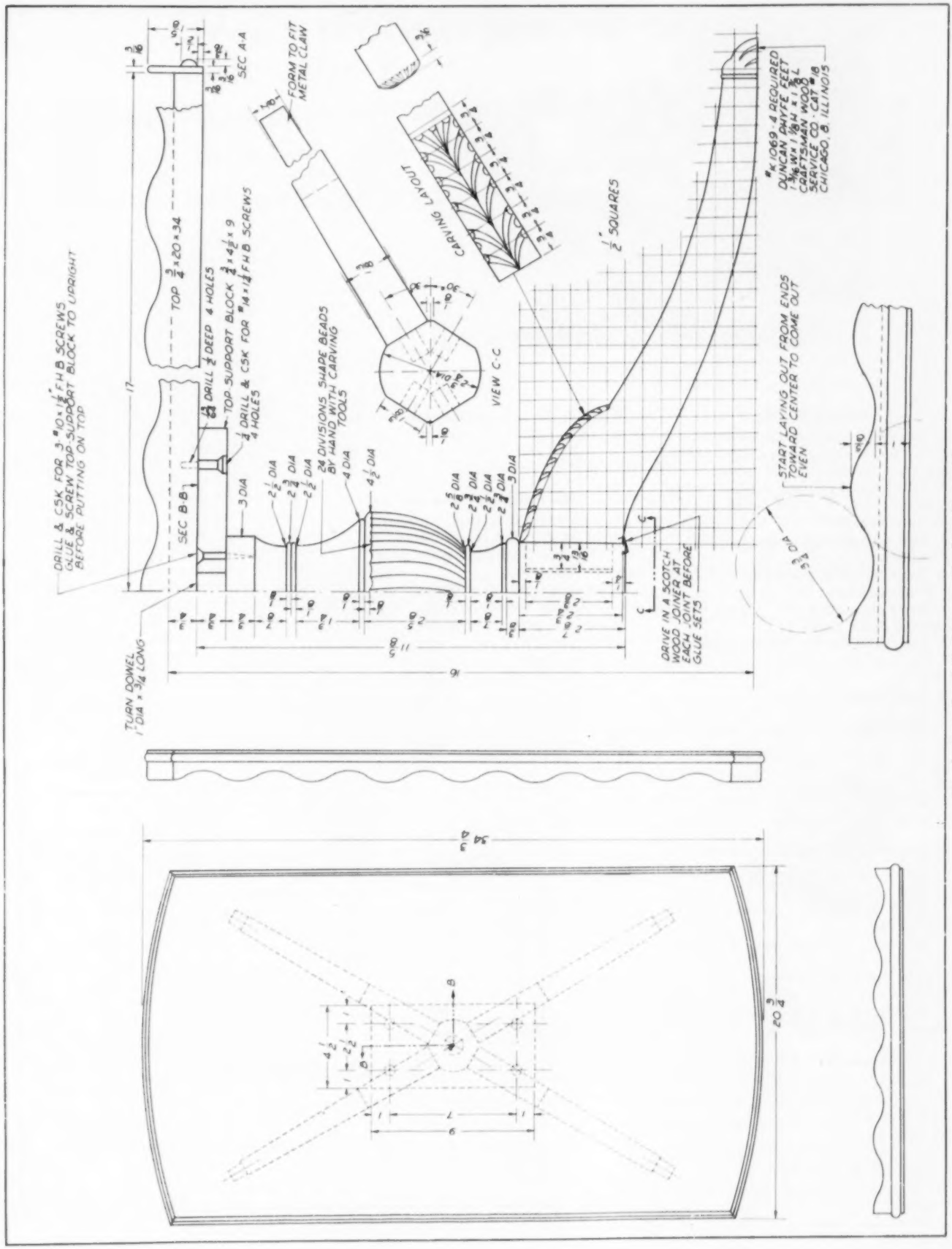

DRILL & CSK FOR 3" #10 x 1" F H B SCREWS
GLUE & SCREW TOP SUPPORT BLOCK TO UPRIGHT
BEFORE PUTTING ON TOP
TOP 3/4 x 20 x 34
DRILL 1/4 DEEP 4 HOLES
TOP SUPPORT BLOCK 3/4 x 4 1/2 x 9
DRILL & CSK FOR #14 x 1 1/4 F H B SCREWS
4 HOLES
SEC B-B
SEC A-A
FORM TO FIT METAL CLAW
CARVING LAYOUT
VIEW C-C
1/2" SQUARES
#K 1069 - 4 REQUIRED
DUNCAN PHYFE FEET
1 1/8 W x 1 1/8 H x 1 3/8 L
CRAFTSMAN WOOD
SERVICE CO. CAT #18
CHICAGO, 8, ILLINOIS
START LAYING OUT FROM ENDS
TOWARD CENTER TO COME OUT
EVEN
24 DIVISIONS SHAPE BEADS
BY HAND WITH CARVING
TOOLS
DRIVE IN A SCOTCH
WOOD JOINER AT
EACH JOINT BEFORE
GLUE SETS
TURN DOWEL
1" DIA x 3/4 LONG

Fig. 6. Details of the Duncan Phyfe coffee table

Fig. 7. The completed table

Making the Top

1. The dimensions of the top being 1 by 19 by 36¾ in., necessitates selecting pieces of well-grained mahogany to be jointed.
2. After edges have been carefully jointed lay out the location of the dowels and drill holes to receive them.
3. Glue top pieces together and allow to dry 12 hours.
4. Scrape off excess glue with a glue scraper and plane surface.
5. Scrape the surface with a cabinet scraper to remove planer marks.
6. Finish scrape with a hand blade and sand.
7. Lay out the shape of the top and cut to size.
8. Smooth edges and ends.

Making the Top Support Block

1. Cut a piece 1 by 4½ by 9 in., and plane edges and ends.
2. Lay out holes to be drilled for screws.
3. Drill holes and countersink to receive No. 10 by 1¼ in. fhb screws.

Making the Fence Molding for the Top

1. Cut two pieces of mahogany 1 by 1½ by 40 in.
2. Resaw these pieces and plane surfaces to $\frac{3}{16}$-in. thickness.
3. Lay out the curves with some round cover or can which has a diameter of 3½ to 3¾ in. See Figure 6.
4. Saw the curves on the band saw.
5. Smooth edges and finish sand with 3/0 sandpaper.

Assemble the Project

1. Glue the legs to the upright.

Before the glue sets drive a scotch wood jointer at the bottom of the mortise-and-tenon joint on each leg.

NOTE: The scotch wood jointers can be secured at any Sears Roebuck Store.

2. Glue and screw the top support block to the upright.
3. Fasten the upright to the top.
4. Fasten the fence molding and ½ in. half round to the edges and ends of the top.
5. Clean off excess glue from the joints, and finish sand to receive the finish.

The Finishing Procedure

1. Stain with a good grade of mahogany oil stain to the desired depth of color.
2. Apply the paste filler and wipe off in a cross grain direction.
3. Apply one thin coat of shellac and sand with 6/0 garnet paper when dry.
4. Apply a good grade of rubbing varnish and allow to dry 48 hours. Then sand with No. 4/0 sandpaper.
5. Apply a second coat of varnish and allow 48 hours for drying.
6. Sand again with No. 4/0 sandpaper and apply the third and last coat of varnish. Allow 48 hours for drying.
7. Rub with pumice stone and oil to desired luster.
8. Fasten Duncan Phyfe metal feet to the legs.

SHOP ROLL CALL SYSTEM

LEWIS MALLOW, JR.
High School
Wabeno, Wis.

In an academic classroom the checking of class attendance at the beginning of each class is a simple matter because each student is assigned a desk and reports to it immediately upon entering the room. Reference to a seating chart quickly determines who is missing from a vacant desk. In the shop where students are not assigned permanent work stations, the taking of roll each day can become time consuming. In many shops the instructor or a student reads the roll while the students indicate their presence. Over a long period much time is used in the taking of roll that could have been used more advantageously. To reduce this time to a minimum the writer employed the following method.

Roll call numbers were placed on the front edges of all bench tops. The numbers were put on in red paint making them easy to read. Two numbers were put on each bench. See Figure 1. The first bench was numbered one and two; second bench three and four, etc. (System of numbering would of course be determined by size of benches and maximum number of students in any one class.) Students were arranged alphabetically and assigned roll call numbers. When they reported to the shop for a class, they sat on the bench tops that corresponded to their roll call numbers. It was then a simple job to spot a vacancy and record

(Continued on page 26A)

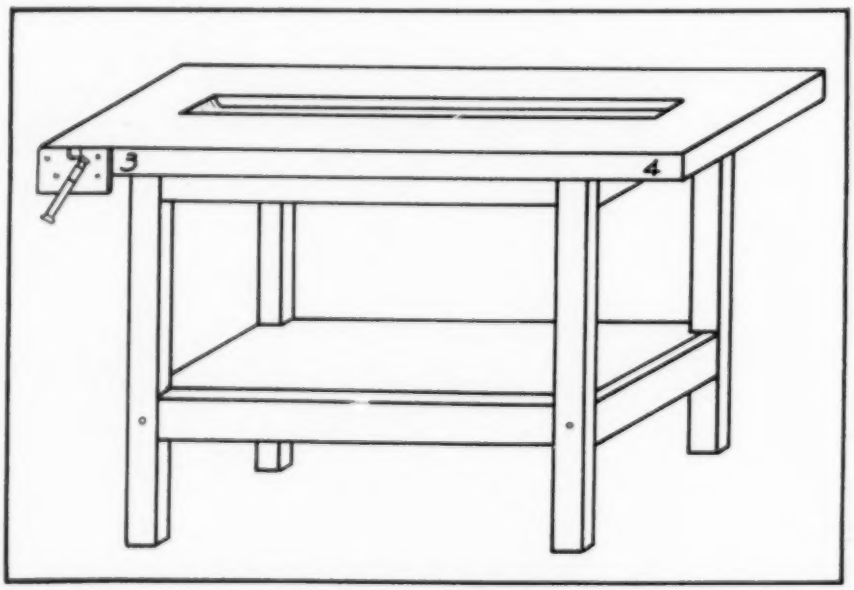


Fig. 1. Shop roll call system

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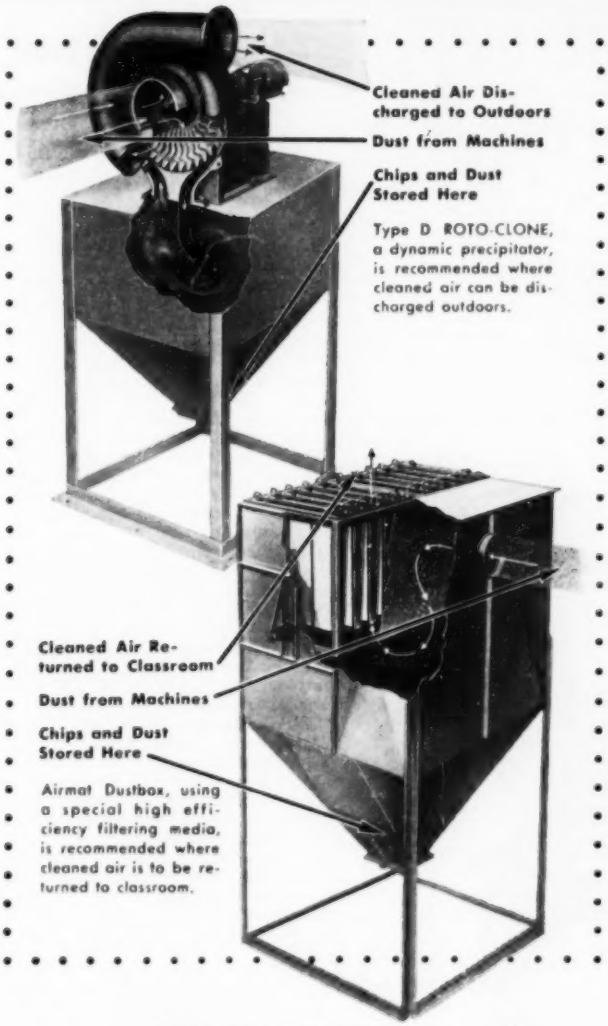
Cleaned Air Discharged to Outdoors
Dust from Machines
Chips and Dust Stored Here
Type D ROTO-CLONE, a dynamic precipitator, is recommended where cleaned air can be discharged outdoors.
Cleaned Air Returned to Classroom
Dust from Machines
Chips and Dust Stored Here
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ROLL CALL SYSTEM

(Continued from page 18B)

it in the attendance record book as an absence. In a matter of seconds the roll was taken and the group was ready for the next shop activity. This method also eliminated minor discipline problems that show up while the class is *settling down* before roll call is taken.

The petroleum industry uses 2800 aircraft in its complex and varied operations to supply petroleum for America's needs. — *Petroleum Newsnotes.*

ASSOCIATION NEWS

(Continued from page 7A)

The new officers of the Association will also be elected at this time.

The following general program has been set up: 8:00-10:00 a.m. — Project Registration; 10:00-12:00 a.m.—Visitation of Commercial Exhibits and Projects; 12:00 — Luncheon (judging to be done during this time); 3:30 p.m. — Speaker, Business Meeting, Awarding of Prizes. — *K. C. Sinclair.*

♦ The Washington Industrial Arts Association held its Fourth Annual State Convention Friday and Saturday, April 16 and 17, in Seattle, Wash. An outstanding program was conducted which proved interesting to all who attended.

At the banquet held at 6:30 p.m., on Friday, April 16, Gilbert S. Schaller, professor of engineering and director of engineering shops, University of Washington; and Lyle Stewart, Ph.D., assistant superintendent of schools in charge of junior high schools and special schools, Seattle Public Schools, were the speakers.

On Saturday morning demonstrations and projects exhibits were held at the Eckstein Junior High School.

Then the business session was held after which the luncheon closed this year's annual meeting.

SHELDON
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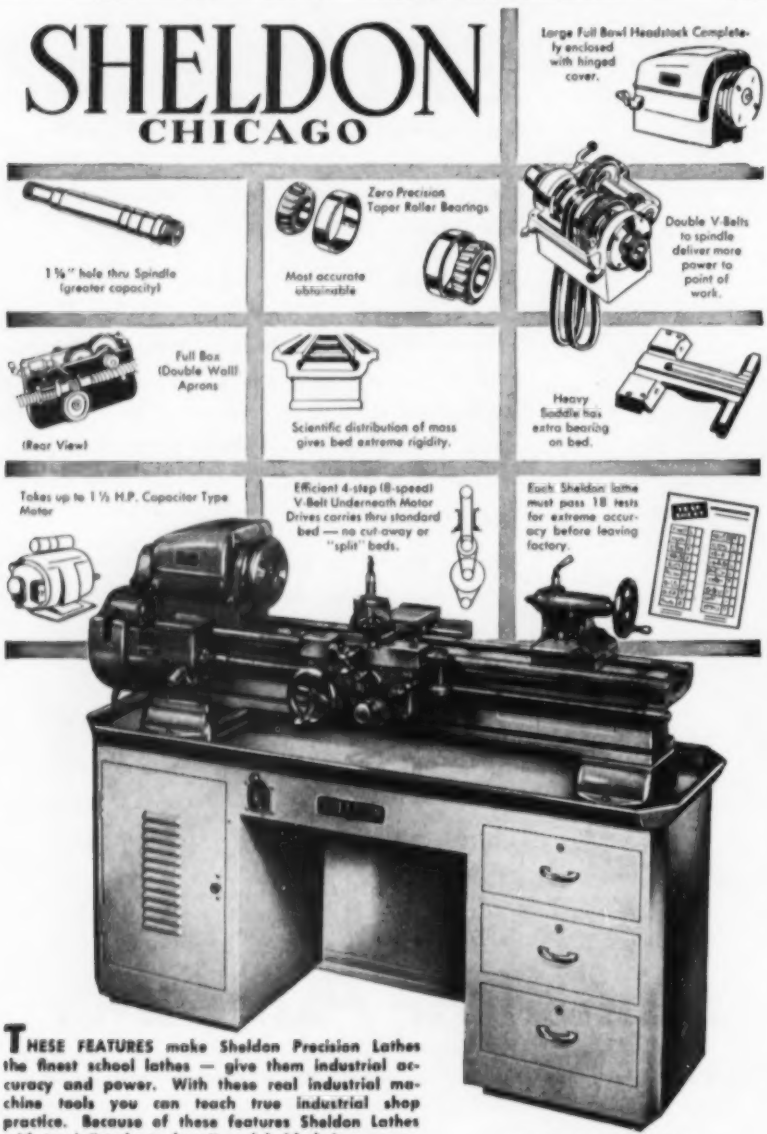
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Personal News

HIRAM E. BARG APPOINTED ASSISTANT DIRECTOR

Hiram E. Barg, personnel counselor and business manager of the Milwaukee Vocational and Adult Schools, Milwaukee, Wis., was named assistant director of the school on March 5, 1954.

Barg's appointment became effective April 1. The post supplements his present duties as business manager.

Mr. Barg joined the vocational school staff as an instructor in banking and accounting in 1928. He later served as faculty counselor for business education, chairman of the salary study committee, faculty counselor, and personnel counselor. He was named business manager in 1945.

Other appointments and transfers were: Prenton Kellenberger from special service counselor to faculty counselor and John Colwell from instructor in social science and occupations to special service counselor.

In addition, Alfon D. Mathison, presently chairman of the apprentice division, was made chairman of the institute of technology. Anthony V. Karpowitz, faculty counselor, was promoted to replace Mathison as apprentice division head. Calvin O. Evans was shifted from the continuation division to the chairmanship of student personnel services and program co-ordinator of teacher assignments for all divisions.

♦ A. P. FATHERREE, Mississippi State Supervisor of Agricultural Education since 1934, has been named "Man of the Year for 1953 in service to Mid-South Agriculture" by the *Progressive Farmer* magazine as well as the "Mississippi Farmer of 1953" by the *Mississippi Farmer*, a state farm and home magazine.

In announcing his award, the *Progressive Farmer* said: "For a most admirable job in the administration of one of the largest and most helpful forces in the service of agricultural education, we are honored to recognize A.P. Fatherree as 'Man of the Year' in service to Mississippi Agriculture."

♦ G. W. HAVERTY, former assistant state supervisor of trade and industrial education in North Dakota, has been named president of the North Dakota State School of Science to succeed E. F. Riley who has served in this capacity since 1921.

Mr. Haverty has also served, since 1929, as head of the trades and engineering division of the State School of Science.

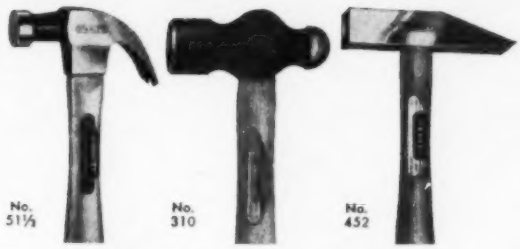
As assistant state supervisor Mr. Haverty has been instrumental in the establishment of part-time training in various towns throughout North Dakota.

He attended Dunwoody Institute, the University of Minnesota, and Colorado State College, receiving his B.S. from the latter.

♦ JOHN H. ERICKSON received the doctor of education degree in industrial-arts education at the summer commencement of the Pennsylvania State College. The title of his dissertation was

(Continued on page 28A)

STANLEY SHOP TALK



The Stanley No. 51½—16 oz. Bell Face Nail Hammer.
Also available:
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HAMMERS

The Stanley No. 310—16 oz. Machinists Ball Pein Hammer.
Also available:
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The Stanley No. 602—7 oz. Magnetic Upholsterers Hammer.

These hammers, in fact *all* Stanley Hammers, are distinguished by heat-treated, drop forged steel heads with selected hickory handles, "Evertite" processed and securely wedged.

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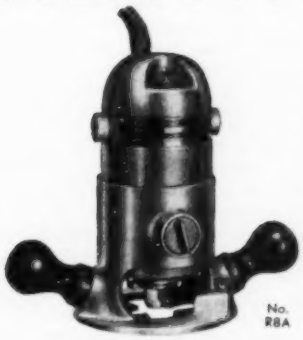
COLD CHISELS

No. 74

The Stanley No. 74—"Strait Cut" Cold Chisels are forged from silicon manganese alloy steel, carefully hardened and tempered. Bit sizes from ¼" to 1" in overall lengths from 5" to 18".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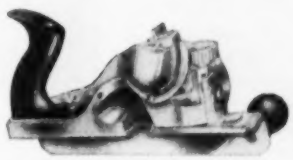
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PERSONAL NEWS

(Continued from page 26A)

"Recommended Equipment Requirements for Comprehensive General Shops Based on Certain Industrial Arts Activities and Objectives for the Junior High School."

Dr. Erickson is associate professor of industrial arts at Georgia Teachers College.

♦ KENNETH E. PARR, former instructor in engineering drawing, casting processes, and electrical construction at Purdue University, is now in charge of trade-apprentice and on-the-job training of skilled workers for the Socony-Vacuum Oil Company of Venezuela. He has just finished completion of a trades training center at the company's Anaco camp in Eastern Venezuela. This is the first trade training in the history of Eastern Venezuela.

Mr. Parr is a graduate of the University of Minnesota.

♦ THOMAS C. ANSKIS died recently. He was a teacher in the New York City board of education in New York City for over thirty years.

♦ FRED DIXON, retired teacher of industrial arts, died at his home in Pluckemin, N. J. He had served in the school system for more than forty years, and retired from Junior High School 43, Manhattan, in 1951.

♦ RAY C. DOANE is the instructor of industrial arts at the Ames Junior High School in St. Paul, Minn.

♦ DONALD VAN BRAMER is teaching at Grafton State School at Grafton, N. Dak. The school is an institution for the feeble-minded. He teaches woodwork and is the physical education instructor.

♦ JOHN YOUNT teaches woodwork and general metals shop in the Needles High School in California. He teaches both junior and senior high school students.

♦ The following are new teachers at Tulsa, Okla.: JACK FREAM, motor mechanics, Central Junior High School; ELBERT WINESBURG, handicrafts, Horace Mann, half time, metals, jewelry, photography, half time, at Central High School; JIM UTLEY, general metals at Horace Mann Junior High School; L. J. LIPNEY, general metals at Roosevelt Junior High School; BOB KINGSLEY, woodwork and drawing at Bell Junior High School, taught industrial arts in Drumright in 1952–53; BILL GUTHRIE, handicrafts and graphic arts at Bell Junior High School, taught industrial arts in Cherokee, Okla., in 1952–53; BONNIE EAST, motor mechanics and vocational auto mechanics at Will Rogers High School; WILEY HAMMOCK, distributive education co-ordinator, Webster High School; EDGAR WILLIAMS, woodwork, half time, at Webster High School; BILL FETTING, woodwork, drawing, and electricity at Wilson Junior High School; J. J. FRISCH, woodwork and electricity at Roosevelt Junior High School.

♦ FRED RETZLOFF, formerly a member of the custodial staff at The Stout Institute, Menomonie, Wis., retired in November, 1953, after serving 43 years.

A farewell celebration was tendered him by the faculty before his departure, and E. J. Shoepp, the business manager of The Institute, made the presentation speech for the gift that had been bought for Mr. Retzloff.

♦ JAMES DAY, formerly of Chadsey High School, Detroit, Mich., is an assistant professor of engineering drawing at Wayne University, Detroit, Mich.

♦ CARL FETHEROFF is teaching general shop at Bret Harte Junior High School in Los Angeles. Mr. Fetheroff taught three years at Hazel Park High School, Detroit, Mich., before going west.

♦ TORRENCE E. HAAG is now welding instructor at Topeka Trade School. Haag's career as a welder began at Boeing Airplane Company, Wichita, Kans., in 1940, where he worked five years as a certified army and navy welder. Since that time he has been employed as a welder in Topeka industries.

♦ The 19th Annual Pennsylvania Industrial Arts Conference will be held at State Teachers College, California, Pa., on April 23 and 24, 1954.

♦ JOHN W. WALGREN has been appointed supervisor of industrial-arts education for the state of Illinois. He has had eleven years of service at the Northbrook schools to his credit, and prior to his work in Illinois had been teaching industrial arts in the state of Iowa.

♦ DENHAM R. GRIFFIN, for two years a battalion supply officer with the 297th Engineer Aviation Battalion, has returned to his career as a teacher. He is now industrial-arts instructor at Nichols Junior High School in Mt. Vernon, N. Y.

♦ E. H. BARTON, formerly metal-shop instructor, Chaffey Union High School, Ontario, Calif., and instructor of apprentice plumbers at Mt. St. Antony's Junior College, Pomona, Calif., is at present serving as vocational education expert with UNESCO in Manila, P. I.

♦ A. J. OSTERGAARD has been appointed head of the vocational drafting department, and co-ordinator of vocational drafting at the Technical High School, Omaha, Neb. He also is a member of the industrial-arts committee for the Omaha public schools.

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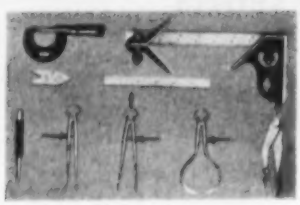

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ACHIEVEMENT TEST— HISTORY OF MANUAL AND INDUSTRIAL EDUCATION*

WILLIAM A. BAKAMIS
Assistant Professor of Industrial Arts
Washington State College
Pullman, Wash.

JOHN MASENGILL
Graduate Student
Bradley University
Peoria, Ill.

This test is designed to measure the achievement of students in a college course in the history of manual and industrial education. The range of a course of this type is so wide that it is difficult to fully measure its content in any one test. A series of tests covering the various units of the course should supplement this test in obtaining a more complete picture of the student's achievement in this field of study.

General Directions: This test is designed to test your general knowledge in the history of manual and industrial education. Do not waste time on any item that you do not know. If you have time before the period ends, review your work and try to answer the test items that you have omitted. Follow carefully the specific directions that are given for each part.

Part I — True and False

Directions: Listed below are one hundred statements, which are either true or false. If the statement is true, underline the letter *T* at the left of the statement. If the statement is false, underline the letter *F*.

Example:

T F X. George Washington was the first president of the United States.

* * *

T F 1. Primitive people had well-defined methods in developing skill.

T F 2. The Russian system of teaching mechanic arts was developed by Della Vos and his associates.

T F 3. The Barbaric people learned skills through imitation.

T F 4. The lack of individual instruction in the Russian system was one of its main weaknesses.

T F 5. The earliest form of apprenticeship is shown in the Babylonian Code of Hammurabi.

*Based on C. A. Bennett's *History of Manual and Industrial Education*, Vol. I and II.

T F 6. The Russian system of teaching mechanic arts was the first to use scientific principles in analyzing the mechanic arts and basing courses of instruction on these analyses.

T F 7. All the great teachers of Talmudic time were working men.

T F 8. The Russian system of teaching mechanic arts involved the organization of instruction shops separate from construction shops.

T F 9. Socrates believed that the banausic arts developed the body.

T F 10. The Imperial Technical School's exhibition of its system of teaching at the Philadelphia Centenial Exposition met with little favor.

T F 11. During the early times apprenticeship covered a period of seven years.

T F 12. The term *sloyd* refers to handwork.

T F 13. The master tradesman was supposed to give the apprentice the same moral, religious training that he gave his own son.

T F 14. Otto Salomon, with the aid of Abrahamson, established the Sloyd school at Naas.

T F 15. During the nineteenth century apprenticeship was the chief educational institution of the upper class in England.

T F 16. Educational sloyd consisted of having children undergo various manipulative exercises in the production of noncommercial articles.

T F 17. Richard Mulcaster, the famous French schoolmaster, was the head of the Ecole Polytechnique from 1861 to 1886.

T F 18. Danish sloyd was flexible to meet the needs of individual students.

T F 19. Mulcaster has been given the credit for being the first to include drawing in the school subjects.

T F 20. Salicis was instrumental in starting what was appropriately considered the pioneer manual-training school in France.

T F 21. Francis Bacon lived in a number of European countries where he wrote several books on education, among which was the "Great Didatic."

(Continued on next page)

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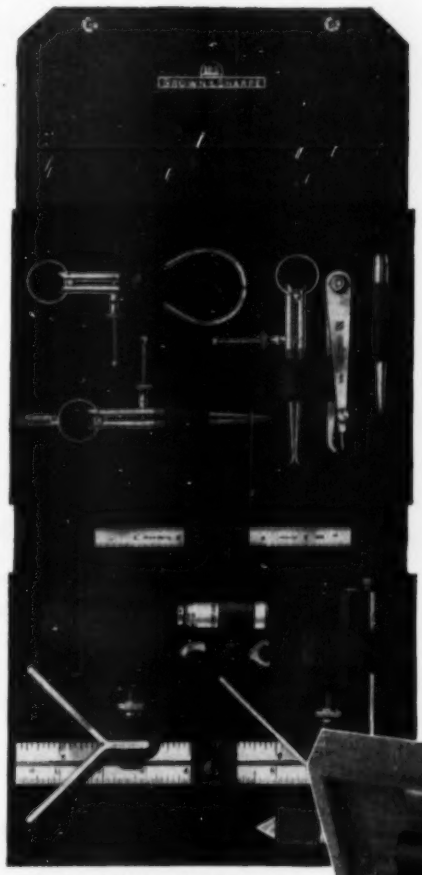

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TEST ON HISTORY OF MANUAL AND INDUSTRIAL EDUCATION

(Continued from previous page)

T F 22. The Corbon Report resulted in a law creating a new order of schools of manual apprenticeship in France.

T F 23. John Amos Comenius was the first to use illustrations in children's books.

T F 24. During the nineteenth century the French instructional program in the evening school was weak.

T F 25. Comenius, unlike Martin Luther, felt that only the physically and mentally superior children should be sent to school.

T F 26. The French Act of 1892 provided for a national system of schools which were "prevocational" in scope.

T F 27. John Dury's ideas on education are expressed in "The Reformed School."

T F 28. Under the French Act of 1892 the schools were under the direction of the Ministry of Commerce and Industry.

T F 29. Sir William Petty included handwork as a phase of education, although he failed to put the idea to practice.

T F 30. The Royal Mechanics Art School at Komotou, Bohemia, was an outgrowth of Salomon's sloyd school at Naas.

T F 31. "Some Thoughts on Education" was written by John Locke to a friend wanting advice as to how to educate his son.

T F 32. Clauson-Kaas was a leader in the Danish educational sloyd movement.

T F 33. As early as 1685 a progressive scheme of education was worked out for Pennsylvania and New Jersey.

T F 34. The term "Industrial Arts" was first suggested by Frederick Bonser.

T F 35. One of Francke's foremost students was Julius Hecker.

T F 36. A course in the theory and practice of manual training was accepted as graduate work at the Kansas State Agricultural College as early as 1896.

T F 37. Rousseau's book, "The Social Contract" has been considered as one of the causes of the French Revolution.

T F 38. The Industrial Art Teachers' Association, organized in 1882, is still active.

T F 39. Rousseau's "Emile" recognizes the nature of the child.

T F 40. The first of the universities to offer professional training courses leading to a degree in manual training was Columbia University.

T F 41. Herbart has been referred to as the "father of manual training."

T F 42. The success of the Sloyd Training school in Boston was fundamentally due to the dynamic leadership of Doctor Runkle.

T F 43. Rousseau's "Leonard and Gertrude" was a financial success.

T F 44. John Dewey believed that manual training in the elementary grades should be regarded as a method of teaching related subject matter.

T F 45. Pestalozzi failed in his attempt to

(Continued on page 34A)

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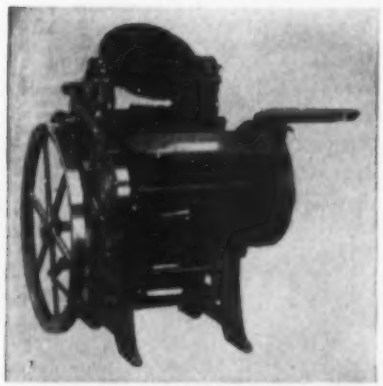

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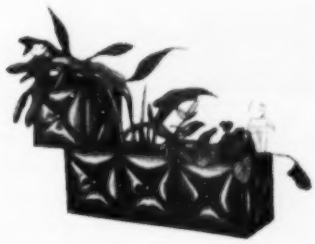

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TEST ON HISTORY OF MANUAL AND INDUSTRIAL EDUCATION

(Continued from page 32A)

establish a school at Verdun and Burgdorf, but he later established one at Surry, England.

T F 46. Milton P. Higgins proposed a "half time school" to train youth for the industries.

T F 47. Pestalozzi's intense desire was to help the poor children of Germany.

T F 48. The Society of Arts and Crafts was incorporated in Boston in 1897 in order to promote legislation for artistic work in all branches of handicraft.

T F 49. Fellenberg is known for his ability in school organization and administration.

T F 50. Woodward's system of teaching was very much similar to the Russian system of tool instruction.

T F 51. Froebel organized the first school known as the kindergarten.

T F 52. Woodward advocated that shops should be supported by constructing products having market value.

T F 53. The Factory Act of 1862 required instruction in the three *R's* be given to all apprentices.

T F 54. The school for Mechanic Arts in Boston was established by Dr. Runkle so that students enrolled in mechanical engineering could receive instruction in shopwork.

T F 55. Joseph Neef organized the New Harmony School at Harmonie, Ind., in 1925.

T F 56. As early as 1891, German law required employers to grant workers under 18 years of age time to attend continuation classes.

T F 57. Robert Owen organized the first Pestalozzian school in America.

T F 58. Salomon received the fundamental idea for his educational sloyd from Cygnaeus.

T F 59. Fellenberg's school furnished the inspiration for the Manual Labor Movement in America.

T F 60. Manual training grew out of French pedagogy.

T F 61. John David Falk established the first school for delinquent children.

T F 62. The manual training movement in Germany during the nineteenth century received its first impulse from Sweden and Denmark.

T F 63. Benjamin Franklin was the first president of Girard College in Philadelphia.

T F 64. Dr. Goetze was one of the first pioneers of the German manual training movement.

T F 65. Thomas Guthrie was one of the outstanding men in the promotion of the Ragged Schools of England.

T F 66. The Leipsic Boys Workshop was one of the first schools established for teaching educational sloyd in Finland.

T F 67. The Mechanics' Institute Movement began in the early part of the nineteenth century.

T F 68. One of the first essentials of the Leipsic method was that manual instruction was not to be given by artisans.

T F 69. The Mechanics' Institute Movement purposed to train apprentices.

(Continued on page 36A)

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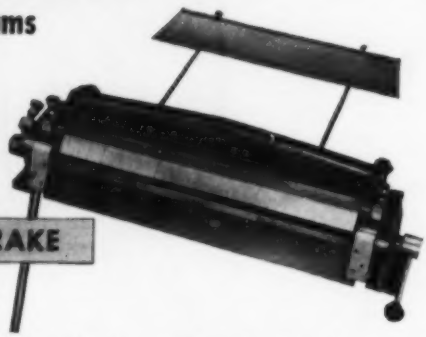
Enlarged Training Programs Possible With These Production Tools of Advanced Design



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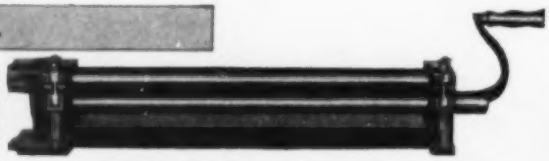

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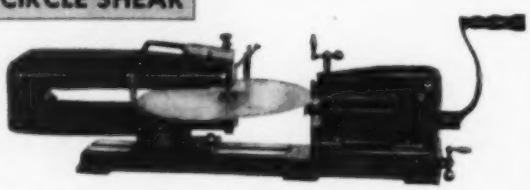

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EVERYTHING IN INDUSTRIAL ARTS SUPPLIES

TEST ON HISTORY OF MANUAL AND INDUSTRIAL EDUCATION

(Continued from page 34A)

T F 70. The Industrial Revolution resulted in a very rapid breakdown of the handicraft system of production in Germany.

T F 71. The Mechanics' Institute Movement in America did not develop as rapidly as it had done in England.

T F 72. Dr. Kerschensteiner was instrumental in the development of the industrial continuation schools in Munich.

T F 73. The Workingmen's College in England grew out of the failure of the Mechanics' Institute.

T F 74. The Central School in England was made up of the specially talented pupils from the other elementary schools in the city or district.

T F 75. John Ruskin was opposed to the Workingmen's College.

T F 76. One of the oldest industrial-art schools was established in Nuremberg, Germany.

T F 77. The first applied science and engineering school in the United States was the Gardiner Lyceum.

T F 78. Revenue for technical education in London during the middle of the nineteenth century was derived chiefly from the unusually high tuitions.

T F 79. Cygnaeus influenced the sloyd system in Sweden.

T F 80. The National Society for the Promotion of Technical and Secondary Education was established to promote more practical technical education in England.

T F 81. The first agricultural society in America was the Philadelphia Society for Promoting Agriculture.

T F 82. Worcester Polytechnic Institute, founded in 1868, was operated like a commercial shop with the students constructing projects having market value.

T F 83. The Land-Grant Act of 1862 did not provide for the establishment of agricultural colleges.

T F 84. John Ruskin and Thomas Carlyle were pioneers in the Arts and Crafts Movement in England.

T F 85. Hartlib's purpose was to elevate farming or husbandry to the level of an art.

T F 86. The Douglas Commissions' Report to the Massachusetts Legislature in 1906 marked the beginning of the Industrial Arts Movement in America.

T F 87. The founder of the Workingmen's College in England was Rev. Fredrick Denison Maurice.

T F 88. The Arts and Crafts Movement in England was a reaction against the factory system of production and aimed at a revival of interest in fine craftsmanship.

T F 89. Cassidorus wrote the first illustrated Latin book for children.

T F 90. The National Society for the Promotion of Industrial Education was influenced greatly by Bonser.

T F 91. Basedow was one of the first writers to use the term "manual arts."

(Continued on page 38A)

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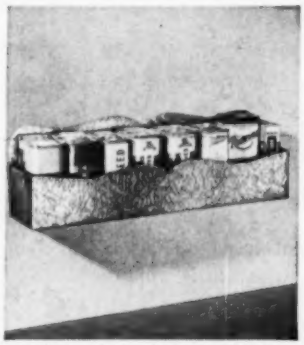

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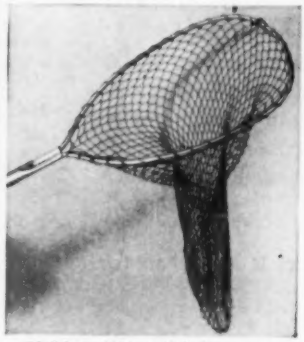

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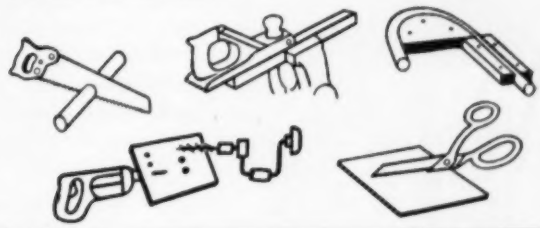
NO SPECIAL TOOLS are needed to work Reynolds *Do-It-Yourself* Aluminum . . . you can saw it, plane it, joint it, shape it, drill it with standard woodworking hand or power tools.

CAUTION: This new material is approved by leading tool makers. You are cautioned, however, to use *only* Reynolds *Do-It-Yourself* Aluminum with the Special Seal on every piece. Other types of aluminum may harm tools.



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free "how-to" booklet and description of easy-to-follow plans:
REYNOLDS METALS COMPANY
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Lowest Prices for Top Quality!
SIMONDS SI-CLONE SAWS

You get Simonds Guaranteed Quality, the buy-word in saws for more than 100 years, at no more than you would pay for regular saws . . . see price list. And Simonds Si-Clone line includes 13 types up to 12" diameter. So get the Si-Clones you need *today* at your local hardware or woodworking machinery dealer.

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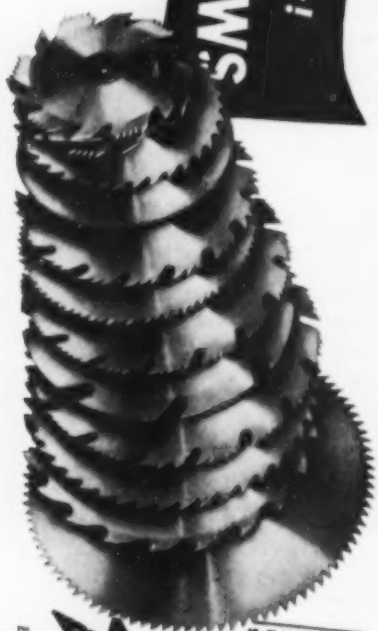

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For Rip, Cut-Off, Easy-Cut and Combination Saws
6" . . . $1.75
7" . . . 2.00
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9" . . . $2.65
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Supplied with Round or Special Shape Holes
As listed in Simonds Catalog "B"

SIMONDS SAW AND STEEL CO.
FITCHBURG, MASS.
Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon.

TEST ON HISTORY OF MANUAL AND INDUSTRIAL EDUCATION

(Continued from page 36A)

T F 92. The main reason for the opposition to trade schools by the labor unions was the misconception that the establishment of such schools was for the purpose of providing a surplus of cheap labor.

T F 93. Gilbert Stuart was the first native American painter.

T F 94. Samuel Gompers was the first president of the National Society for the Promotion of Industrial Education.

T F 95. Cooper Union was one of the few labor unions supporting the establishment of trade schools in America.

T F 96. The National Vocational Education Law provided for land grants to colleges, which were publicly supported.

T F 97. The Smith-Hughes Act of 1917 provided for trade training of less than college grade.

T F 98. The "Fitchburg Plan" was an outgrowth of the part-time cooperative school program in Cincinnati.

T F 99. The municipal trade schools of Paris met with little public approval.

T F 100. The Philanthropic Society founded in England was organized to establish industrial schools.

Part II — Completion

Directions: In the blank space or spaces in each of the 24 incomplete statements that appear below, write in the word or words that will make the statement complete and true. (*Only one word for each blank.*)

Example:

X. The city of Chicago is located in the state of Illinois.

* * *

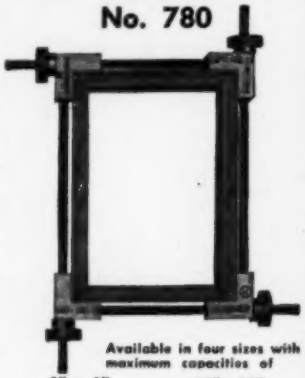
101. The most capable teacher on Pestalozzi's staff at Yverdun was .....

102. The father of the vocational guidance movement in America was .....

103. John Dury expressed his ideas on education in his book entitled, "..... ...."

104. The only state that today possesses

Now!
A Four Corner Clamp . . .
HARGRAVE
No. 780



Available in four sizes with maximum capacities of
8" x 8" 12" x 12"
18" x 18" 24" x 24"
Extensions available to increase above capacities.

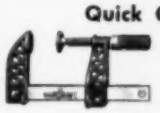
Standard Carriage Clamps

in 9 sizes for all average applications.

Steel Spindle Hand Screws

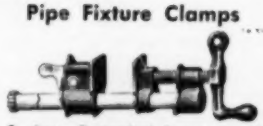
in 8 sizes for wood working. Jaws may be adjusted for various angles.

Quick Clamps



in 61 sizes in 12 different types. Fast . . . easy to use for all applications.

Pipe Fixture Clamps



in 2 sizes. Economical bar type clamp. Fits ½" — ¾" pipe.

No. 640 "I" Bar Clamp

in 7 sizes with patented quick locking moveable jaw. Three other type bar clamps also available.

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The Complete Line of Tested TOOLS

the "dual system" of education is .....

105. Our school of applied science is based on Bacon's philosophy of .....
106. Froebel recommends handwork as the center of his system of education in his book "..... ...."
107. The credit for developing the art of bookmaking goes to .....
108. The St. Louis school for manual training was developed by .....
109. The person referred to as the "father of manual training" is .....
110. The school of Hofwyl was founded by .....
111. The authors of the Vocational Act of 1917 were ..... and .....
112. The author of "Wealth of the Nation" was .....
113. Froebel is known for the development of the .....
114. The person employed by the National Society for the Promotion of Vocational Education to assist in the promotion of state and national legislation was .....
115. "Choosing a Vocation" was written by .....
116. The first Infant School was established by .....
117. "School and Society" was written by .....
118. The first Pestalozzian school in America was organized by .....
119. The person responsible for the success of the Boston School of sloyd work was .....
120. The development of manual training work in France was influenced by the report of Senator .....
121. The Manual Arts Conference, which is still active today was organized by ..... and .....
122. The person who was instrumental in organizing 54 industrial continuation schools in Munich was .....
123. The Vocational Education Movement began in 1906 with a report by the ....
124. The New Harmony educational experiment was carried on under the supervision of .....

Part III — Multiple Choice

Directions: Each of the questions or incomplete statements listed below is followed by several words, phrases, or series

(Continued on next page)

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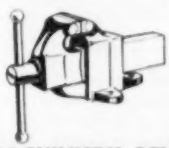
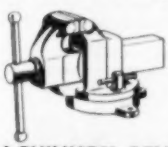
MORGAN'S
DUAL PURPOSE
18A WOODWORKING
VISE

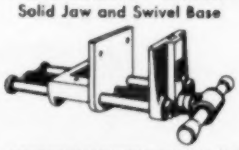
The new Morgan 18A vise represents a major improvement in woodworking vises. Now, for the first time, it is possible to combine the speed and convenience of a conventional Rapid Action vise with the smooth positive action of the Continuous Screw vise. Morgan has combined these important features in the new 18A Dual Purpose Woodworking Vise. Months of research, development and exhaustive tests have proven the superior qualities of the 18A. All semi-steel castings are machined to close tolerances. The cold rolled screw is machined with a continuous buttress thread operating in a floating nut. The front jaw is pushed up to the work and a slight turn of the tubular steel handle locks the work securely in position. The jaw is 4" deep, 7" wide and opens to 9". Adjustable stop built into front jaw.



MACHINISTS' BENCH
Solid Jaw and Stationary Base



MACHINISTS' BENCH
Solid Jaw and Swivel Base



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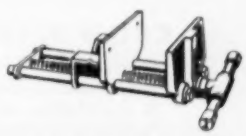
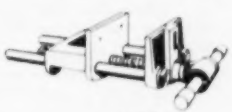
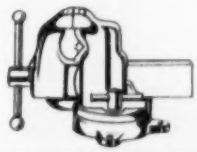


QUICK ACTION VISE



JUNIOR
WOODWORKERS' VISE



COMBINATION PIPE

MORGAN VISE COMPANY
112 N. JEFFERSON ST. • CHICAGO 6, ILLINOIS

TEST ON HISTORY OF MANUAL AND INDUSTRIAL EDUCATION

(Continued from previous page)

of numbers. From these, you are to choose the one which answers the question or completes the statement correctly. Place the letter of that word or phrase (*a*, *b*, *c*, *d*, or *e*) in the numbered blank space at the left of the item.

Example:

b X. The author of *History of Manual and Industrial Education* is:
- *a*) Frank Parsons
- *b*) Charles A. Bennett
- *c*) Frederick Bonser
- *d*) Calvin Woodward
- *e*) Charles Richards

* * *

... 125. The person who established the first normal school for sloyd in Finland was:
- *a*) Abrahamson
- *b*) Salomon
- *c*) Cygnaeus
- *d*) Goetze
- *e*) Della Vos

... 126. The Vocational Guidance Movement was started by an address given by:
- *a*) Dewey
- *b*) Parsons
- *c*) Haney
- *d*) Woodward
- *e*) Mann

... 127. The organization which directly influenced the passage of the Smith-Hughes Act of 1917 was the:
- *a*) Douglas Commission
- *b*) Manual Arts Conference
- *c*) Industrial Arts Teachers Association
- *d*) National Society for the Promotion of Industrial Education
- *e*) National Education Association

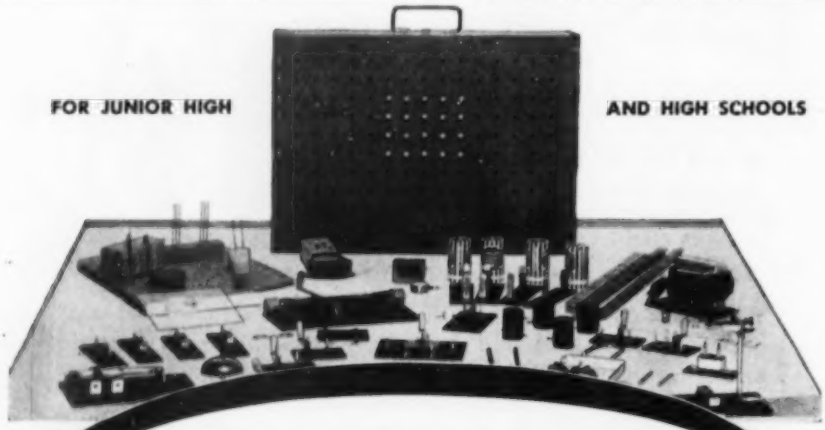
... 128. Which of these principles did not apply to the Russian system of teaching mechanic arts?
- *a*) Separate instruction shops
- *b*) All models made from drawings
- *c*) All articles must be useful
- *d*) Drawings are made by pupils
- *e*) Exercises arranged according to difficulty

... 129. The term *Gymnasium* in Germany referred to:
- *a*) The classical secondary school
- *b*) Universities of higher learning
- *c*) The elementary schools
- *d*) Technical schools
- *e*) Teacher training institutions

... 130. The development of the Industrial Continuation Schools in Munich were due to the leadership of:
- *a*) Goetze
- *b*) Clauson-Kaas
- *c*) Kerschensteiner
- *d*) Bismarck
- *e*) Von Schenckendorff

... 131. The National Vocational Education Act of 1917 provided for:
- *a*) Part-time schools for young workers over 14 years of age
- *b*) Vocational training of college grade
- *c*) Appropriations for buildings to carry on trade training
- *d*) Appropriations to private institutions

(Continued on page 42A)



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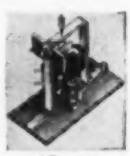
Write for detailed bulletin



AC motor assembly

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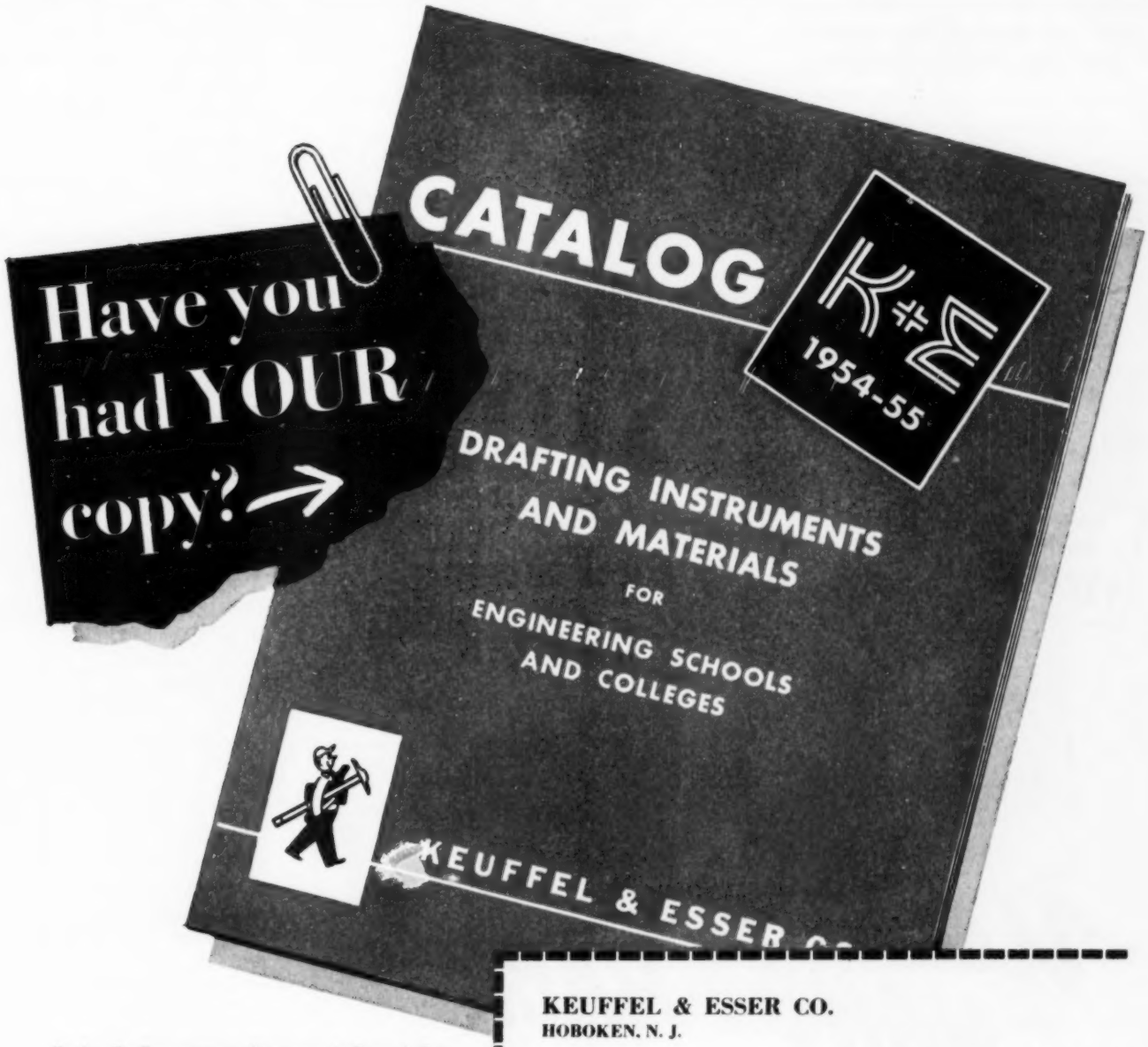

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TITLE.....

SCHOOL.....

STREET.....

CITY.....ZONE.....STATE.....

TEST ON HISTORY OF MANUAL AND INDUSTRIAL EDUCATION

(Continued from page 40A)

e) Vocational education for boys between the ages of 10 to 16.

... 132. Which state operates under a separate board for vocational education?
a) Massachusetts
b) Missouri
c) Illinois
d) Wisconsin
e) New York

... 133. The Vocational Education Movement in the United States began in:
a) 1882
b) 1896
c) 1906
d) 1914
e) 1917

... 134. Which of these organizations does not belong in this group?
a) Manual Training Teachers Association of America
b) American Manual Training Association
c) Eastern Arts Association
d) Western Drawing Teachers Association
e) Industrial Art Teachers' Association

... 135. The credit for establishing the first kindergarten goes to:
a) Comenius
b) Luther
c) Rabelais
d) Froebel
e) Geik

... 136. The person who brought the writings of Comenius to the public attention in England was:
a) Davidson
b) Hartlib
c) Anderson
d) Geik
e) Froebel

... 137. America's first great painter was:
a) John Symbert
b) Wilson Peale
c) Benjamin West
d) Washington Alliston
e) Gilbert Stuart

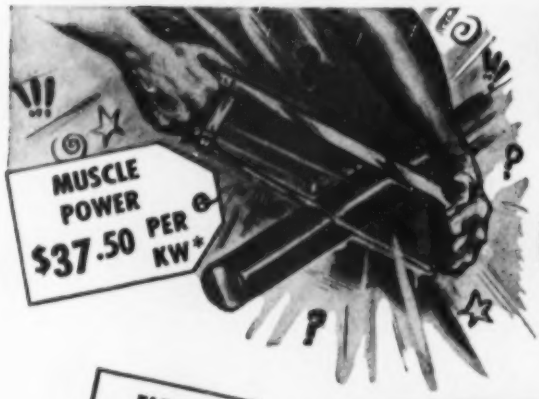
... 138. The first native American painter was:
a) James Claypoole
b) Gilbert Stuart
c) John Trumbell
d) Van Dyke
e) Wilson Peale

... 139. During the early period the center of American art was:
a) Charleston, South Carolina
b) Boston, Mass.
c) New York City
d) Washington
e) Richmond, Virginia

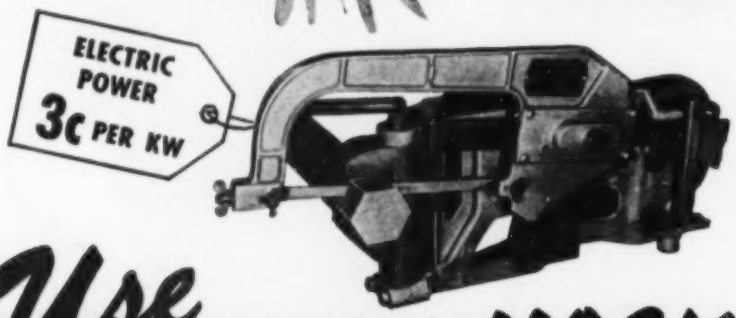
... 140. The headmaster of the Merchant Taylor School from 1861 to 1886:
a) Montague
b) Mulcaster
c) Rabelais
d) Bacon
e) John Milton

... 141. *The Reformed School* was written by:
a) John Dury
b) John Milton
c) John Evelyn
d) Samuel Hartlib
e) Julius Hecker

(Continued on page 44A)



STOP Hand Hacksawing LABOR



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PORTABLE POWER HACKSAW

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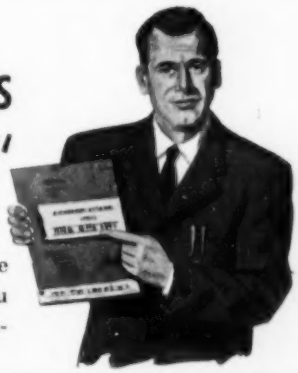

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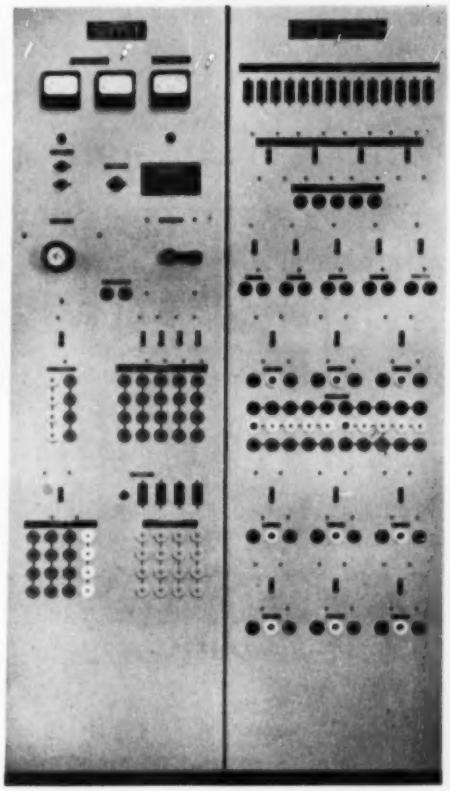
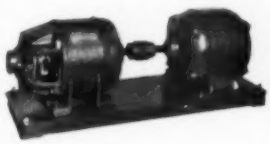


CONNECTOR CORDS
Other types furnished to meet requirements.



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Contemplating new Electric Shop ☐
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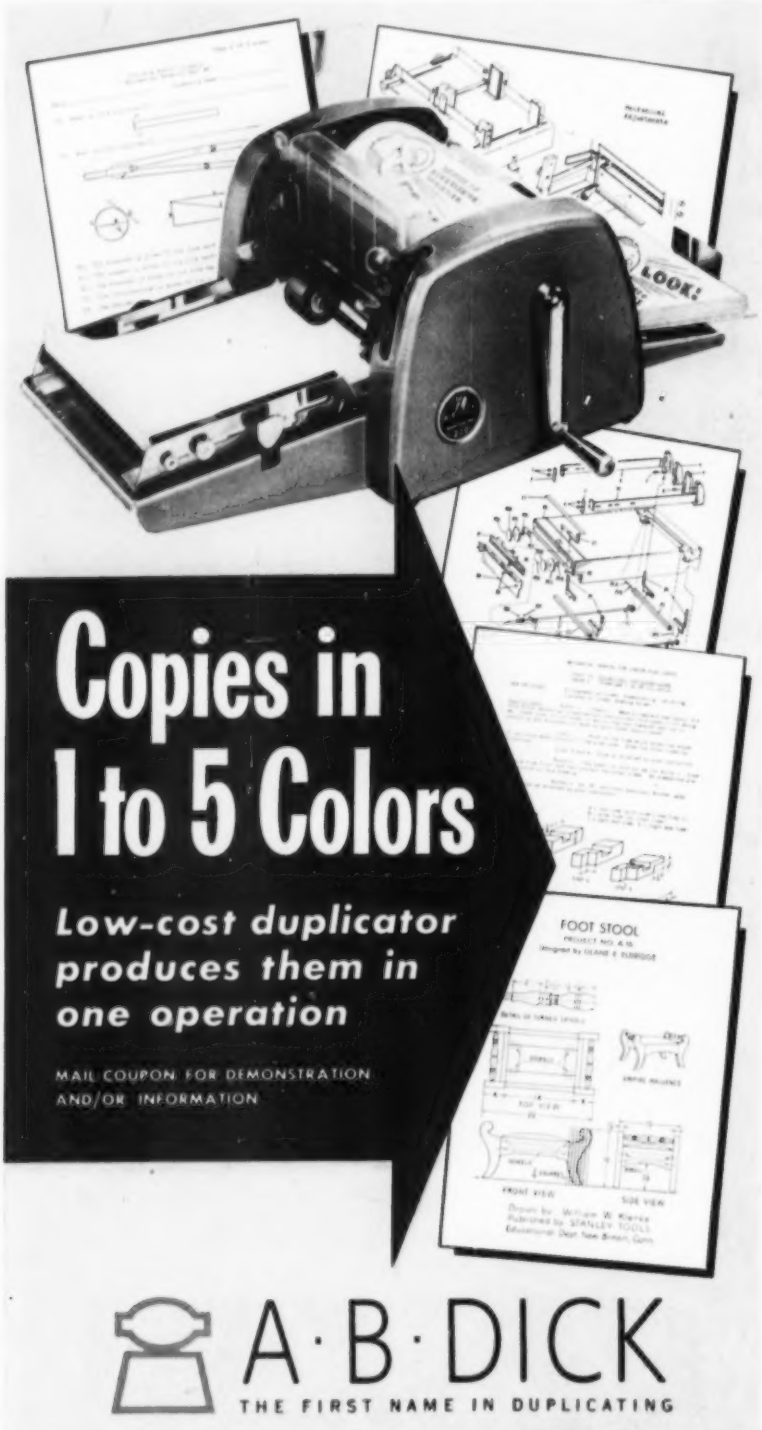

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TEST ON HISTORY OF MANUAL AND INDUSTRIAL EDUCATION

(Continued from page 42A)

... 142. Evidence of the manual arts and science are found in the remarkable work *Mechanick Exercise or Doctrine of Handy Works*, written by:
a) Franke
b) Salomon
c) Moxon
d) Goetze
e) Bacon

... 143. "Some Thoughts on Education" was written as a series of letters to a friend by:
a) Sir Isaac Newton
b) Bacon
c) John Dury
d) John Locke
e) Thomas Budd

... 144. As early as 1685 a progressive scheme of education was proposed for Pennsylvania by:
a) Dr. Benjamin Rush
b) Thomas Budd
c) William Petty
d) Julius Hecker
e) John Milton

... 145. Fellenberg purchased an estate of 600 acres and started his school near:
a) Yverdun
b) Stanz
c) Hofwyl
d) Neuhof
e) Paris

... 146. The first school organized by Pestalozzi was:
a) Neuhof
b) Stanz
c) Burgdorf
d) Yverdon
e) Ulzen

... 147. The author of *Educational Sloyd* was:
a) Brewster
b) Pabst
c) Salomon
d) Cygnaeus
e) Backe

... 148. The first institution of Applied Science and Engineering in America was:
a) Rensselaer
b) Gardiner Lyceum
c) Eaton

d) Yale
e) Columbia

... 149. Who is the author of *Art and Industry?*
a) Wilder
b) Ware
c) Clark
d) Bache
e) Anderson

Part IV – Matching

Directions: From the list of phrases that appear in Group "B" below, choose the phrase that is most closely related to each of the words or phrases in Group "A." Place the identifying letter in the parenthesis to the left of the word or phrase.

Example:
(u) X. Harry S. Truman

* * *

GROUP *A*

( ) 150. sloyd
( ) 151. Russian system
( ) 152. M. P. Higgins
( ) 153. Woodward
( ) 154. Runkle
( ) 155. Leipsic method
( ) 156. Naas
( ) 157. Oswego
( ) 158. Stout Institute
( ) 159. Cooper Union
( ) 160. Larsson
( ) 161. Banausic
( ) 162. Mulcaster
( ) 163. Talmud
( ) 164. Charles Richards

GROUP *B*

a) Series of exercises, used to teach a trade.
b) Privately endowed institution in Wisconsin.
c) Trade school in New York.
d) Developed art of bookmaking.
e) Method of teaching manual training in Germany.
f) President of M. I. T.
g) St. Louis Manual Training School.
h) American "half-time schools."
i) Swedish form of manual training.
j) Swedish town where Abrahamson established sloyd school.
k) One of the first normal schools to offer manual training.
l) "Merely mechanical."
m) Laws of the Jews.
n) Merchant Taylor School.
o) Founder of Teachers College, Columbia University.
p) Suggested term "industrial arts."
q) Labor union favoring establishment of trade schools.

(Continued on next page)

let 'er go, skipalong,
stick with the "K" brand you know

"Maverick" usually spells trouble, in the classroom as well as out on the range. Being an unknown quantity or a "Johnny-come-lately," it leaves room for genuine doubt as to performance and to quality. And that's the reason so many experienced instructors insist upon using Kester Acid-Core Solder and Kester Plastic Rosin-Core Solder or Kester "Resin-Five" Core Solder . . . dependable "brands" for more than 50 years.

DO IT NOW! *Write today for your free copies of the Kester Soldering Manuals . . . the instructor edition and the student edition (tell us how many copies).*

KESTER
SOLDER COMPANY
4257 WRIGHTWOOD AVENUE • CHICAGO 39, ILLINOIS
NEWARK 5, NEW JERSEY • BRANTFORD, CANADA

TEST ON HISTORY OF MANUAL AND INDUSTRIAL EDUCATION

(Continued from previous page)

r) Taught sloyd work in Boston.
s) *Mechanick Exercises or Doctrine of Handy Works.*
t) Land grant movement.
u) President of the United States.

Part V — Matching

Directions: Group II consists of a number of countries. From this group select the country which is related to, or associated with each of the statements or phrases appearing under Group I. Place the letter of the appropriate country in the space provided to the left of each item.

Example:
(a) X. Empire State Building

* * *

GROUP I

( ) 165. Normal School established by Cygnaeus
( ) 166. Senator Corbon's Report on manual training
( ) 167. Royal Mechanics Art School at Komotau
( ) 168. National grant of 2500 crowns for sloyd schools
( ) 169. Leipsic method
( ) 170. Imperial Technical School
( ) 171. Salicis Manual Training School
( ) 172. National Vocational Education Act
( ) 173. Columbian Exposition
( ) 174. 54 industrial continuation schools in one city

GROUP II

a) America
b) Austria
c) Bohemia
d) Canada
e) Denmark
f) England
g) Finland
h) France
i) Germany
j) Greece
k) Russia
l) Romania
m) Sweden
n) Switzerland
o) Turkey

Part VI — Matching

Directions: Group *A* includes some of the leaders in manual and industrial education. From Group *B* select the country where each person in Group *A* did the most outstanding work, and place the letter of that country in the parentheses to the left of the name.

Example:
(a) X. Bennett

* * *

GROUP *A*

( ) 175. Salomon
( ) 176. Haney
( ) 177. Goetze
( ) 178. Cygnaeus
( ) 179. Maurice
( ) 180. Della Vos
( ) 181. Corbon
( ) 182. Ruskin
( ) 183. Salicis
( ) 184. Pestalozzi
( ) 185. Mulcaster
( ) 186. Fellenberg
( ) 187. Francke
( ) 188. Harvey
( ) 189. Moxon
( ) 190. Wehrli
( ) 191. Bacon
( ) 192. Froebel
( ) 193. Rush
( ) 194. Petty
( ) 195. Locke
( ) 196. Kerschensteiner
( ) 197. Pabst
( ) 198. Richards
( ) 199. "Hoke" Smith
( ) 200. Tolain

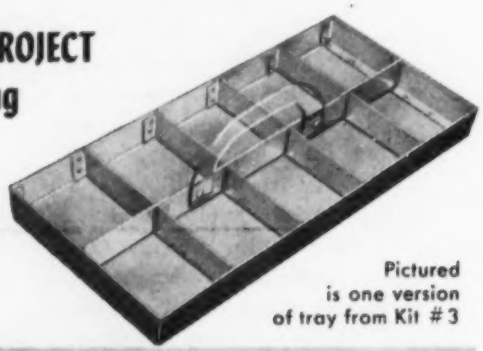
GROUP *B*

a) America
b) Austria
c) Denmark
d) England
e) Finland
f) France
g) Germany
h) Russia
i) Sweden
j) Switzerland

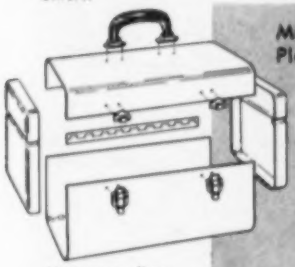
(Continued on page 48A)

Now; A JUNIOR HIGH PROJECT
Another in the expanding line of SCHWEIZER SCHOOL PROJECTS...

A kit of universal application, featuring a variety of materials. Easily adaptable for the Junior or Senior High School Shop groups. A practical and useful Tray for Student, Mother, Dad, Brother, Sister and others.



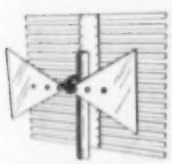
Pictured is one version of tray from Kit # 3



Utility Kit # 1A

Multipurpose Tray KIT # 3. Complete with all materials Plus extra supply of Aluminum, Plastic, and Rivets $1.95

Here is the third in the SCHWEIZER series of school projects—each project designed specifically as a teaching medium in Aircraft Aluminum with a practical and useful end product.
NOTE: Designed to fit the SCHWEIZER Utility Case (Project # 1 or 1A) or for many other purposes. Size: Fits 17" x 8" case.



TV Antenna Kit # 2 for UHF Areas

Select this SCHWEIZER KIT as a project or the complete series for your shop program.

SCHWEIZER KIT # 1A, Completely pre-formed as shown, also includes Blueprint, Construction Procedure, Rivet Set and Rivets for easy assembly. Finished size 17" x 8" x 8". Special School Price, each $4.25.
Also SCHWEIZER KIT # 1 with ends pre-formed only; Rivet Set Included ..... $3.95 each

Students can build the Bow Tie TV Antenna Kit with materials from KIT # 2 or # 2A.
SCHWEIZER Antenna Kit # 2 requires forming and drilling ..... $3.45 each
SCHWEIZER Antenna Kit # 2A, drilled, cut and pre-formed ..... $4.95 each

NOTE: New Quantity Prices on all Kits.

SPECIAL QUANTITY DISCOUNTS

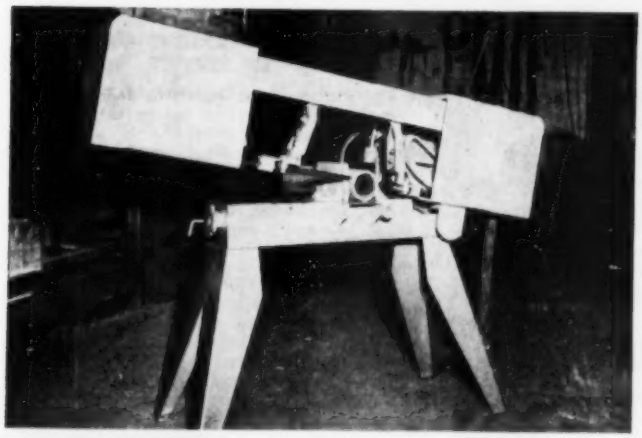
Kit #	Quantity	Price Per Kit
1	6-11	$3.56
1A	6-11	3.83
2	6-11	3.11
2A	6-11	4.45
3	6-11	1.76
1	12-35	3.36
1A	12-35	3.62
2	12-35	2.94
2A	12-35	4.21
3	12-35	1.66

Prices over 35 on Request

SCHWEIZER AIRCRAFT CORP., Educational Div., Elmira, N. Y.

Send me the following kits: (See prices listed above)
UTILITY CASE ..... Kit No. 1A— Quantity Pre-formed ..... @ $ .... Kit No. 1— Quantity Ends Pre-formed Only @ $ .....
BOW-TIE TV ANTENNA ..... TV Antenna Kit No. 2— Quantity Requiring Drilling @ $ .... TV Antenna Kit No. 2A— Quantity Drilled, Cut & Formed @ $ .....
TRAY ..... Utility Tray No. 3 Quantity @ $ .....
All prices f.o.b. Elmira, N.Y.—Weight: Case Kit 4½ lbs; TV Kit 2 lbs; Tray Kit 1½ lbs.
☐ FREE booklet "Construction Kits for School Shop Students and Home Craftsmen."
☐ Check for amount enclosed. ☐ Bill the school—Purchase order No. .....
Your Name ..... (Please print) (Title)
Name of School .....
Address ..... (City) (Zone) (State)

you can use
HIGGINS INK
with more than 30 instruments
HIGGINS INK flows smoothly, dries uniformly, gives fine lines or heavy lines, washes or dense blacks . . . helps you do your best with any instrument, in many techniques — and HIGGINS PEN CLEANER cleans them all!
The Basic Art Medium
Since 1880
HIGGINS INK CO., INC. BROOKLYN, NEW YORK



KALAMAZOO

METAL CUTTING BAND SAW • MODEL 610

CUTS 6" ROUND, 10" FLAT STOCK

Here's another *Kalamazoo* saw that will help make your teaching work easier. Model 610 combines lightweight portability with ruggedness, accuracy and safety. And its cost is low, too. When requisitioning equipment for your department, include *Kalamazoo*. Get a demonstration and full details from your *Kalamazoo* dealer.

MACHINE TOOL DIVISION

Kalamazoo TANK and SILO CO.

819 HARRISON ST., KALAMAZOO, MICHIGAN

SPECIAL DISCOUNT OFFER

(FOR LIMITED TIME ONLY)

TO INTRODUCE **WALTON** AND **REPS** SHOP TOOLS TO YOUR SCHOOL

WALTON TAP EXTRACTORS

CUT COSTS OF REMOVING BROKEN TAPS

Universally used for removing stubborn, balky taps that break off deep in threaded work. Quick, easy, inexpensive. Will not damage threads.

WALTON-AMERICAN TOOL HOLDERS

REDUCE TOOL CHANGE-OVER TIME

May be set for straight, right or left hand offset positions. Will hold with perfect grip any size square or round tool bit or boring bar from ⅛" to 7/16".

"REPS" PIPE & STUD EXTRACTORS

REMOVE BROKEN PIPES AND STUDS EASILY AND QUICKLY

Makes a strong, four-point grip without need for hammering or pounding. Hardened steel — will remove any material.

SPECIAL DISCOUNT OFFER: **Until July 15, 1954, we will allow 25% extra discount on the purchase of any or all of these three tools. Write today for special quotations on your requirements and Catalog No. 32.**

THE WALTON CO., Hartford 10, Conn.

TEST ON HISTORY OF MANUAL AND INDUSTRIAL EDUCATION

(Continued from page 46A)

SCORING KEY

Part I — True and False

1. F	10. F	19. T	28. T	37. T
2. T	11. T	20. T	29. T	38. T
3. T	12. T	21. F	30. F	39. T
4. F	13. T	22. T	31. T	40. T
5. T	14. T	23. T	32. T	41. F
6. T	15. F	24. F	33. T	42. F
7. T	16. F	25. F	34. F	43. F
8. T	17. F	26. F	35. T	44. T
9. F	18. T	27. T	36. F	45. F
46. T	57. F	68. T	79. T	90. F
47. F	58. T	69. F	80. T	91. F
48. F	59. T	70. F	81. T	92. T
49. T	60. F	71. F	82. T	93. F
50. T	61. T	72. T	83. F	94. F
51. T	62. T	73. T	84. T	95. F
52. F	63. F	74. T	85. T	96. F
53. T	64. T	75. F	86. F	97. T
54. T	65. T	76. T	87. T	98. T
55. F	66. F	77. T	88. T	99. F
56. T	67. T	78. F	89. F	100. T

Part II — Completion

101. Krusi
102. Parsons
103. *The Reformed School*
104. Wisconsin
105. Realism
106. *The Education of Man*
107. Cassidorus
108. Woodward
109. Pestalozzi
110. Fellenberg
111. Smith and Hughes
112. Adam Smith
113. Kindergarten
114. Prosser
115. Parsons
116. Oberlin
117. Dewey
118. Neff
119. Larsson
120. Corbon
121. Selvidge and Bennett
122. Kerschensteiner
123. Douglas Commission
124. Owen

Part III — Multiple Choice

125. *c*	130. *c*	135. *d*	140. *b*	145. *c*
126. *b*	131. *a*	136. *b*	141. *a*	146. *a*
127. *d*	132. *d*	137. *c*	142. *c*	147. *a*
128. *c*	133. *c*	138. *a*	143. *d*	148. *b*
129. *a*	134. *e*	139. *a*	144. *b*	149. *c*

Part IV — Matching

150. *i*	153. *g*	156. *j*	159. *c*	162. *n*
151. *a*	154. *f*	157. *k*	160. *r*	163. *m*
152. *h*	155. *e*	158. *b*	161. *l*	164. *p*

Part V — Matching

165. *g*	167. *c*	169. *i*	171. *h*	173. *a*
166. *h*	168. *m*	170. *k*	172. *a*	174. *i*

Part VI — Matching

175. *i*	181. *f*	187. *g*	193. *a*	199. *a*
176. *a*	182. *d*	188. *a*	194. *d*	200. *f*
177. *g*	183. *f*	189. *d*	195. *d*	
178. *e*	184. *j*	190. *j*	196. *g*	
179. *d*	185. *d*	191. *d*	197. *g*	
180. *h*	186. *j*	192. *g*	198. *a*	

NOW

...teach DC-AC motor construction and operation by Visual Experiment

with CROW ELECTRI-KIT model 700

Model 700 set up as magneto electric machine

ROTATING ELECTRIC MACHINE

For the first time—a kit so simple, so practical that high school students can grasp the principles of electric motors, generators and alternators readily. Assemblies built from Model 700 components perform exactly like commercial machines, yet the kit's ingenious design makes it amazingly easy to assemble and operate.

- Same basic parts—baseboard, frame ring, axle and bearings—are used in every experiment.
- Kit can be used anywhere . . . no special wiring, floor space or floor load problems.
- Safe—cannot shock. Operates on six to 110 V. DC or 110 V. 60-cycle AC.
- Motors can be assembled and disassembled with only a screwdriver.
- Students see all parts and coils in operation at all times.

NEW, COORDINATED TEXT-MANUAL MAKES COURSE EASY TO TEACH, EASY TO LEARN!

- Completely new. 270 pages, 65% pictures.
- Reduces theory, assembly and operation of rotating electric machines to simplest possible terms. Course can be taught easily by instructors with very limited electrical training.
- Divides each experiment into four sections:
  1—Discussion of theory involved.
  2—Demonstration by instructor.
  3—Step-by-step instructions for assembly of machine.
  4—Comprehensive pictorial review.
- Assemblies cover 25 machines including . . .
  Permanent magnet generators and motors
  DC series shunt and compound generators and motors
  Commutation and interpoles
  One, two and three phase AC motors and alternators
  Maintenance and trouble shooting

On a cost per experiment basis, the Crow Rotating Electric Machine is by far the most economical equipment you can buy.

Write for complete details and prices

CROW ELECTRI-CRAFT CORPORATION

DIV. OF UNIVERSAL SCIENTIFIC CO., INC. • BOX 336G, VINCENNES, INDIANA

News Notes

DUNWOODY STARTING 40th YEAR OF SERVICE

The William Hood Dunwoody Industrial Institute opened its doors to the youth of America in 1914. Since then 156,452 students have used the facilities of that school to lay for themselves sturdy foundations for a useful life in business and industry.

Since the opening of this institution of learning, 28 of Dunwoody employees have been honored for having finished 25 years of service in helping the young acquire the right kind of habits and skills.

The latest assignment taken over by this school is to bring the blessings of vocational industrial education to the inhabitants of Indonesia. The Ford Foundation is assisting financially to teach Indonesians such things as machine-shop practice, woodworking, electricity, auto mechanics, Diesel engineering, printing, etc.

THE NEW STOUT INSTITUTE LIBRARY

On Stout Institute's "M" Day, Tuesday, March 9, students and faculty joined forces to move nearly 40,000 volumes from Stout's obsolete library facilities to the spacious new college library building. To encourage the workers, a continuous lunch was served.

President Fryklund, Dean Jarvis, and Willis Capps gave the instructions for moving the books at the morning convocation at eight o'clock.

The students left the auditorium in groups of about 75 to avoid standing in line and rushing the newly trained student crew.

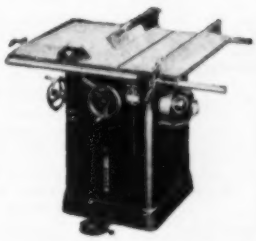
During the morning and the afternoon, the refreshment committee served 2640 doughnuts and about 2600 cups of coffee.

(Continued on page 50A)

Here's Why 67% of U.S. School Shops Are Equipped With Rockwell-built

DELTA POWER TOOLS

DELTA 12" Lathe



DELTA 10" Unisaw (also available in 12" model)

DELTA 14" Band Saw (also available in 20" model)

DELTA 17" Drill Press (also available in 14" model)

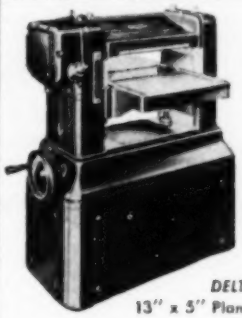
DELTA 6" Jointer (also available in 8" model)

DELTA 24" Scroll Saw

DELTA 7" Standard Motor Grinder

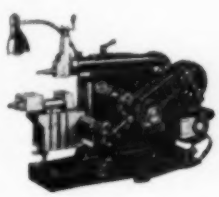
DELTA 6" Abrasive Belt Finishing Machine

DELTA Wood Shaper



DELTA 13" x 5" Planer

DELTA 12" Abr... Disk Finishing Machine



DELTA 7" Metal Shaper

☆ **SIMPLE** to learn on

☆ **SAFE** to use

☆ **EASY** to move where you want them

☆ **ACCURATE** and ruggedly built to *stay* accurate

☆ **GREATER VERSATILITY** for increased usefulness

☆ **INEXPENSIVE** to buy, to operate, and to maintain

The outstanding advantages that make DELTA Power Tools the choice for 67% of U. S. school shops are also creating an entirely new production concept in industry. The same DELTA Tools used so widely for industrial arts and vocational instruction are supplementing—and in many instances replacing—costly immovable machines in industrial plants everywhere. More and more of your students will use DELTA Power Tools on their jobs after graduation—an important reason for training them on DELTA Tools now. Call your DELTA Dealer; he's listed in your classified phone book under "TOOLS" or "MACHINERY." And write for AB-53 catalog. *Delta Power Tool Div., Rockwell Manufacturing Co., **402E** North Lexington Ave., Pittsburgh 8, Pa.*

DELTA QUALITY POWER TOOLS

ANOTHER PRODUCT BY—

Rockwell

Increased production facilities allow immediate delivery on school orders . . . NO WAITING!

NEWS NOTES

(Continued from page 48A)

At noon, an hour of rest and some badly needed nourishment was taken. Then at 1:00 p.m., the library moving crew started off again, and at four o'clock the last book was carried into the new library. The well-organized plans for moving into the new library had been completed successfully.

SOMETHING FOR HIGH SCHOOL SENIORS TO PONDER

Ten suggestions addressed to high school seniors who plan to attend college were made on Tuesday, January 19, 1954, by Elwood C. Kastner, dean of admissions and registrar at New York University.

Competition for admission is increasing as more persons seek to enter college, Dean Kastner pointed out. This development should induce the prospective college student to plan intelligently and apply early, he said. The U. S. freshman total is up 6 per cent over last year.

Here are the NYU dean's suggestions:

1. Discuss your educational plans with your high school guidance officer, your teachers, and your parents.

2. Determine your educational objectives. Don't be disturbed or postpone your plans to go to college if you have not selected a specific career. Keep in mind that college helps to prepare for successful living, not just for a successful career.

3. Remember that no college *gives* you anything. Colleges do, however, provide an opportunity for those who are capable and eager to profit from their educational experience.

4. Review carefully the catalogs and bulletins of the colleges which interest you. Whenever possible, visit these institutions.

5. Keep in mind that there are many excellent colleges and universities where the objectives you have established can be achieved.

6. File formal application to those colleges in which you have a strong and sincere interest. Complete all questions on the form if you wish to avoid delays in the processing of your application.

7. After you receive an acceptance, inform the college of your decision as soon as your plans are made. Prompt action will be helpful both to the college and to yourself.

8. Apply yourself now; your senior year in high school is very important. This will give you a running start toward success in college.

9. Do not be deterred by lack of funds. Colleges will advise you on various forms of aid.

10. Because the selection of a college is a crucial decision, weigh all the factors carefully. Recognize superficial attractions for what they are.

♦ The Ford Motor Company, in their 1953 Foto File of a selected number of the industrial arts awards projects, are offering an outstanding aid to the future of project design for the students of industrial arts and vocational education.

There should be at least one of these helpful files in the possession of every city supervisor of industrial arts so that shop teachers of this country will have access to the fine designs pictured.

The illustrations included in the file show fine examples of student work done in the following fields: architectural drawing, ceramics, electricity, leathercraft, machine shop, mechanical drawing, models, molding, open division, patternmaking, plastics, printing, woodwork, and wrought metal.

Ford Motor Co., Industrial Arts Awards, Dearborn, Mich.

♦ The National Paint, Varnish, and Lacquer Association has prepared an educational brochure designed to attract students to the paint, varnish, and lacquer industry.

The booklet is titled "Your Brightest Tomorrow" and tells what the industry offers to students. Chapters in the brochure include "Unlimited Opportunity," "Satisfaction," "Recognition of Ability," "Future Security," and "Happiness for You and Yours."

The center section of the book contains a personnel chart, showing the many and varied positions in the paint, varnish, and lacquer industry and the educational requirements for each position. While the brochure is designed for high school students, the emphasis is on further education, especially in matters relating to the technical phase of the industry.

Aside from the technical positions available, the brochure points out that there is a need for salesmen, engineers, clerical personnel, accounting, advertising, and other openings which lead to higher positions in the industry.

In order to assure wide distribution of the brochure, the National Paint, Varnish, and Lacquer Association is making it available to industry members at 10 cents per copy.

♦ The sixth annual Chicago area career conference, to be held March 20 at Illinois Institute of Technology, 35 West 33 St., Technology Center, Chicago 16, Ill., is expected to attract more than 2000 high school and junior college students with a common problem — "What should I do when I get out of school?"

Approximately 100 experts from industry, the professions, and the trades will be present to give the youths firsthand advice to guide them in choosing their lifework.

The conference is sponsored jointly by Illinois Tech, the Chicago Technical Council, and the Chicago *Sun-Times*, and was first held in 1948. It has been so successful in recent years that other communities have patterned events after it.

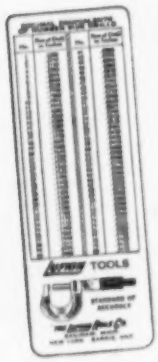
There is only one belief that can be disproved by force — the belief in force. — *Ussher.*

Shop TEACHING AIDS...

yours for the asking from LUFKIN

"MICROMETER READING MADE EASY"
Interesting 12-page booklet is cleverly illustrated in cartoon style. Tells how to read to both thousandths and ten-thousandths of an inch. How to care for and adjust a micrometer.

"TIME SAVERS"
Circular slide rule type. Gives size of tap, threads per inch, size of tap drill, and decimal equivalents.



"DRILL CARDS"
Gives decimal equivalents of parts of an inch on one side, and decimal equivalents of number size drills on the other side.

"THE AMAMING STORY OF MEASUREMENT"
20-page four-color booklet traces the history of measurement from prehistoric times to the present. Interesting cartoon style.

USE THE COUPON BELOW

BUY LUFKIN TAPES • RULES • PRECISION TOOLS
From Your Regular Source of Supply
THE LUFKIN RULE COMPANY, Saginaw, Michigan
132-138 Lafayette St., New York City • Barrie, Ontario

ORDER A SUPPLY Adequate for Your Class Needs

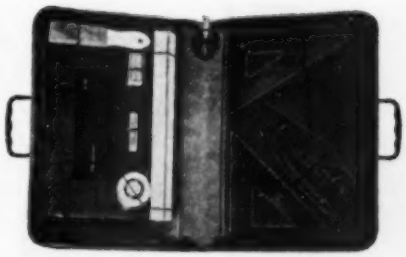
THE LUFKIN RULE COMPANY, Dept. VE, Saginaw, Michigan
Please send me, without charge, shop teaching aids in the quantities indicated.
_____"Micrometer Reading Made Easy"
_____"Time Savers"
_____"Drill Cards"
_____"The Amazing Story of Measurement"
Name_____
School_____
Address_____
City_____ Zone_____ State_____

299

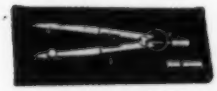
Why so many instructors like students to use BERGER all-in-one drafting kits

Your students are really "present" in class with the Berger Drafting Kit, fully-equipped with every tool they need . . . every day. Sessions get under way promptly . . . no interruptions by students begging the loan of a protractor, a triangle, a scale. You'll find it indispensable as a teaching aid.

Tell your students about the Berger Kit — and tell us how many you need. It costs so little — less than buying the items individually.



PATENT PENDING



BERGER DRAWING SET #512
Nickel-silver master bow pencil; in velvet lined case. Price including complete kit — $8.41.
With interchangeable nickel silver master bow — $9.96.
Prices quoted are for quantities of 6 or more kits. Instructors may buy sample kit at same low price.

YOUR CHOICE OF 8 DIFFERENT TYPE DRAWING SETS — PLUS

Protractor	French Curve
Architect's Scale	Draftsman's Tape
Engineer's Scale	Pencil Pointer
8" Triangle	2 Drawing Pencils
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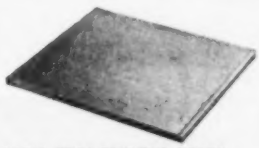

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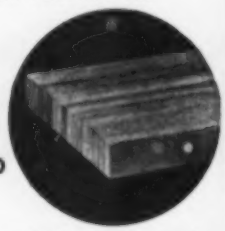

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SHOP EQUIPMENT NEWS

(Continued from page 64A)

The new Tele-Trol Electronic Timer

previous cycle, if triggering occurs before shut-off is reached.

The Tele-Trol Timer handles a 30-amp. non-inductive load at 125 *V* a.c. Timer operates on 110-volt single phase but models are available for 220 or 440 *V* 3-phase operation. Over-all size is approximately 3 by 4 by 5 in. This timer furnishes an accurate means of delaying shut-off or start on all types of units such as work feeding devices and other equipment utilizing electrical motor drives.

Full details are available from *Benchmaster Mfg. Co., 1835 W. Rosecrans Ave., Gardena, Calif.*

(For Convenience Circle Index Code 0509)

NEW REAR-PROJECTION SCREEN

A new rear-projection screen is made of Krene which distributes light evenly throughout the picture and permits viewing from unusually wide angles. Translucent Krene with a specially embossed surface diffuses light passing through it,

(Continued on page 54A)

Bakelite Company Rear-Projection Screen

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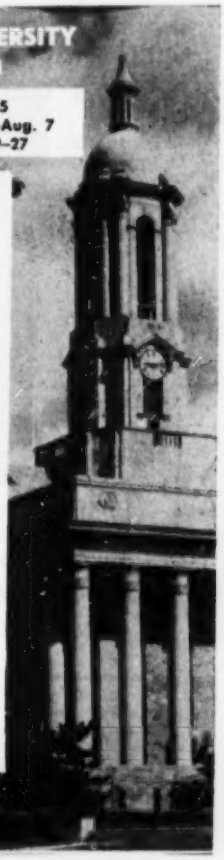

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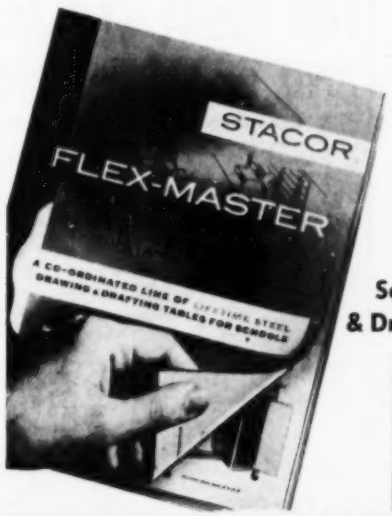

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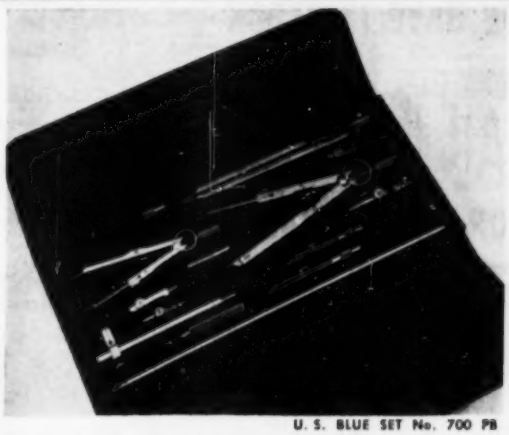

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SHOP EQUIPMENT NEWS

(Continued from page 52A)

eliminating the so-called hot spot of brighter light in the center of the projected picture.

Durable and flexible, Krene is easily folded for carrying with a portable frame of lightweight aluminum tubing. A 9 by 12-ft. screen and accompanying frame fit into a handy carrying case only 6 by 9 in., and 4 ft. long.

The sturdy frame can be quickly unfolded and set up at the desired tilt and the screen attached by strong snap fasteners. The new rear-projection screens, in standard sizes from 43 by 58 in., to 10½ by 14 ft., are available with or without the portable frames.

For further information write to *Bakelite Company, a Division of Union Carbide and Carbon Corp., 2600 Madison Ave., New York 16, N. Y.*

(For Convenience Circle Index Code 0510)

NONMETALLIC TAPE WOVEN FROM NEW MIRACLE FIBERS

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This tape is excellent wherever a nonconductor is needed. Often such measuring goes across farm lands where electric fences give "jolts" to men measuring with steel or metallic woven tapes.

DESCRIPTIVE FOLDER AVAILABLE

A four-color folder describing the Hi-Line, and listing lengths, markings available, and prices, can be obtained by writing to *The Lufkin Rule Co., Saginaw, Mich.*

(For Convenience Circle Index Code 0511)

New Publications

Personnel Management: Principles, Practices and Point of View

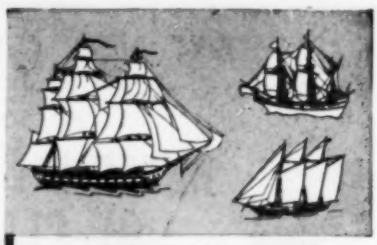
By Walter Dill Scott, Robert C. Clothier and William R. Spriegel. Fifth Edition. Cloth, x + 690 pp., $6.50. New York: McGraw-Hill Book Company, 1954.

An understanding of modern industrial personnel practices should be required of every teacher in vocational education. This book, standard in the field, covers the subject in 38 chapters organized under these headings:

The Background and Development of the Personnel Function, Personnel Tools and Records, The Use of Psychology in Personnel Administration, Training and Education, Employee Incentives, Special Problems in Personnel Administration and Management, Employee Representation and Social Controls, and Personnel Management as an Integrating Function in Operation.

The student being trained for industry has a much better chance of getting along if he understands what he is getting into. Not only must he know his job but it is important to know the framework in which his job rests. It also is worth while for him to know exactly how management is going to pay him, handle his problems, and promote him. The teacher who is interested in

(Continued on next page)



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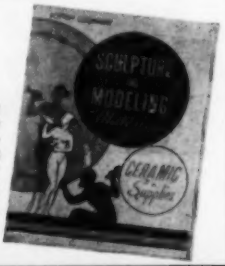

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NEW PUBLICATIONS

(Continued from previous page)

giving this type of information to his student will find this book very helpful. All of the authors are educators, two of them are presidents emeriti of leading universities and all of them have had industrial experience or are now consultants in the field. — *Richard S. Fitzpatrick.*

Practical Psychology

By F. K. Berrien. Rev. Ed. Cloth, xv + 640 pp., $5. New York: The Macmillan Company, 1952.

An interesting sidelight on this book is the author's comment in the preface to the second edition that "every textbook writer is a pirate. He depends upon the brains and efforts of countless hard-working investigators who publish their results, often at their own expense, in journals many of which are not copyrighted." The author acknowledges his debt to these researchers.

Part One consists of five chapters dealing with the psychology of adjustment and covers such things as study efficiency and mental health.

Psychology applied to industry is covered in the six chapters of Part Two which deal with employment, training and industry, efficiency, morale, and accidents. The two chapters in Part Three cover consumer and advertising research and the psychology of advertising. Part Four is made up of four chapters dealing with psychology applied to crime. Vocational guidance and effective writing and speaking are the titles of the two chapters in the concluding part.

The book includes a 10 page appendix on simplified statistics, and a name and subject index. Dr. Berrien, formerly Professor of Psychology at Colgate and now Director of Research for the Institute for Research in Human Relations, presents pertinent research in many areas which are of interest to those in vocational education. — *Richard S. Fitzpatrick.*

Instructional Leadership

By Gordon N. Mackenzie, Stephen M. Corey and Associates. Cloth, 209 pp., 5⅝ by 8¼ in., $3.25. Bureau of Publications, Teachers College, Columbia University, New York, N. Y.

This book presents the outcome of three years of co-operative experimentation by school personnel and consultants of Denver secondary schools.

Part One presents the group's conception of leadership, the meaning of leadership, how to select leaders, how leadership is exercised in school situations, and what must be done to improve leadership.

Part Two describes the Denver setting, project activities, leadership in small groups, and an evaluation of the Denver leadership project.

COMPREHENSIVE GUIDE TO YEARBOOK PRODUCTION OFFERED

A comprehensive guidebook to help in the preparation of school yearbooks has just been published by Art Instruction, Inc., of Minneapolis, Minn., as a part of its special student service. The book entitled, "Your School Yearbook: An Opportunity in Art," was prepared for art students who are members of high school and college yearbook staffs, and is made available free of charge to yearbook advisers and students actively engaged in yearbook production.

Written under the direction of Art Segal, who has supervised the production of over 1500 yearbooks, the book presents the task and responsibility of the school art staff together with practical suggestions for achieving yearbook success.

In the interest of preparing a finer, more interesting yearbook, it is suggested that you write today for your copy of "Your School Yearbook: An Opportunity in Art." Please indicate whether you are a faculty adviser to the yearbook staff, school art instructor, or a student art editor. Address, Art Instruction, Inc., Minneapolis, Minn.

Home, School, and Community Experiences in the Homemaking Program

By Druzilla Kent, Margaret Alexander, and Mary Laxson. Office of Education Vocational Division Bulletin No. 252, Home Economics Education Series No. 29, 1953, 69 pp., 25 cents. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Building a close relationship between school experiences and home experiences has been a characteristic part of homemaking instruction ever since federal funds were first made available for the development of vocational education programs in homemaking.

This bulletin was prepared to show teachers some ways that learning experiences carried on at school, in the home, and in the community can be integrated into a *total* program focused on over-all homemaking education goals.

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An analysis of the operation of the apprenticeship system of the Kearney and Trecker Corporation, West Allis, Wis., indicates that apprenticeship pays rich dividends over the years. A company may depend on its apprenticeship system not only for its supply of skilled craftsmen, but also for supervisory and administrative personnel.

Copies of this publication may be obtained free of charge from the *Publications Branch, Bureau of Apprenticeship, U. S. Department of Labor, Washington 25, D. C.*

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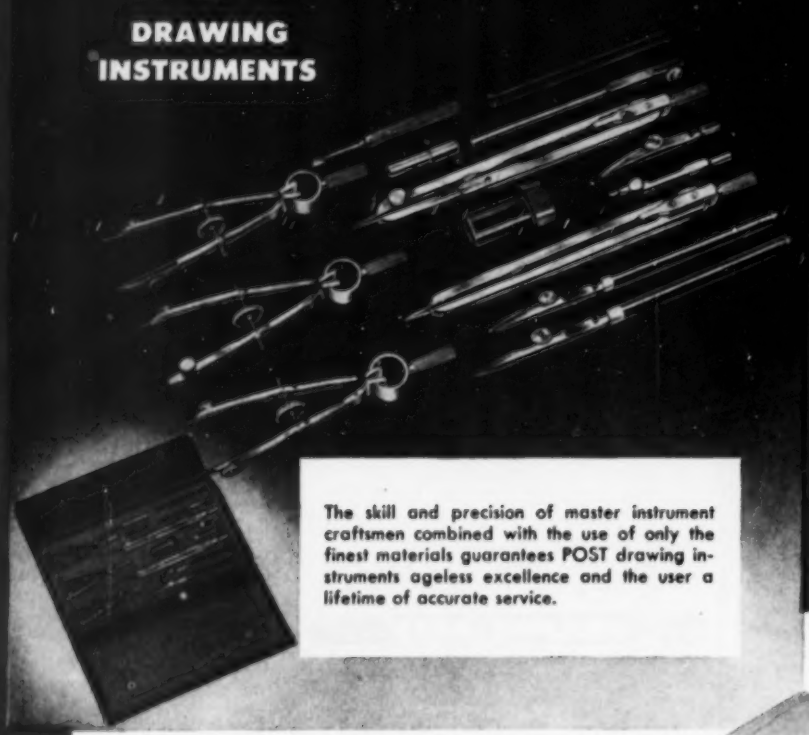

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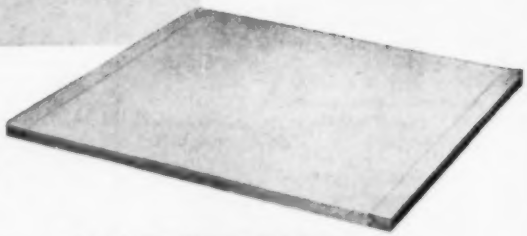

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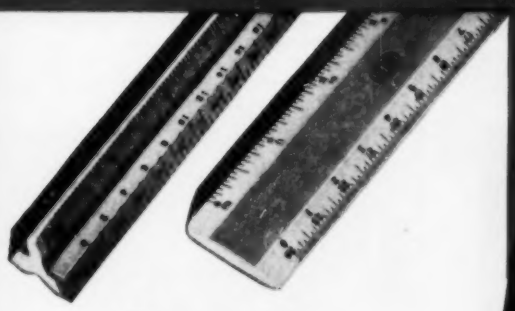

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- Envelopes for Drawing Papers
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- Erasing Shields
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- Lettering Guides
- Lettering Paper Blocks
- Pencils
- Pencil Pointers
- Pen Points—Holders
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- Scales
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- Slide Rules
- Strathmore Artist Board
- Templates
- Triangles
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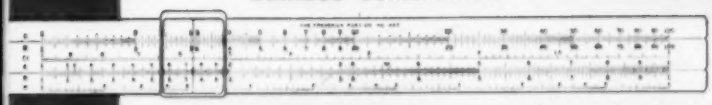
POST **SLIDE RULES**

Bamboo Construction



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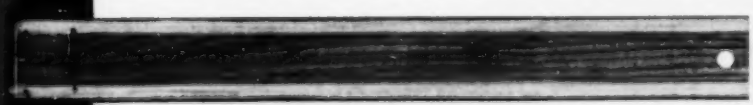

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SHOP EQUIPMENT NEWS

NEW INEXPENSIVE SLIDE FILE BOX

A new Kodaslide Ready-File which will hold approximately 200 standard Kodachrome transparencies in Ready-Mounts or 100 Kodaslide Stereo Mounts has been announced by the Eastman Kodak Company.

The new Kodaslide Ready File which accommodates 2 by 2-in. Slides or Stereo Mounts

The new file is styled in attractive nonshatterable polystyrene and designed to permit stacking. Slides mounted in glass as well as those in Ready-Mounts as well as combinations of 2 by 2-in. slides and Stereo Mounts can be accommodated by this file box.

Four index cards are provided with the file to permit filing slides in six groups. A sufficient number of indexing slots are provided to allow filing groups of 3 to 100 as desired. An index sheet is also included inside the box cover. This index sheet will not fall out of the cover, but may be easily removed for notations as desired.

For further information write to *Eastman Kodak Co., Rochester 4, N. Y.*

(For Convenience Circle Index Code 0501)

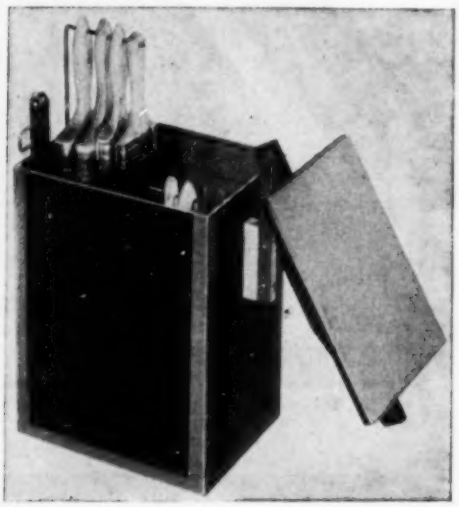
NEW SHOP "VAPOR ACTION" BRUSH CONDITIONER

Wisconsin Laboratories, Inc., manufacturers of the Protexem Vapor Action paintbrush conditioners, have announced the development of a New Shop model.

This brush conditioner was specially developed to meet the needs of the school shop. It is a sturdy metal cabinet with tight fitting hinged cover. The brush supports lift out of the container making the selection of a brush very easy.

The Vapor Type of brush conditioner is the only scientific device developed to date for keeping brushes always ready to use. It makes practical use of the scientific fact that the vapors of solvents are much more potent than the liquid solvents, which means that brushes hung in vapors will keep soft and pliable. Vapor action dissolves the binding oils or the resins in paint and varnish, keeping the brush always ready.

Brushes which are left out carelessly and which have become hard are quickly restored to usefulness. For the busy shop man this presents the ideal method for keeping brushes in good



working condition. It saves time for him and for his students.

For further information write to *Wisconsin Laboratories, Inc., Dousman, Wis.*

(For Convenience Circle Index Code 0502)

WILLIAMS REDESIGNS OPEN END-BOX WRENCH LINE

Williams line of open end-box "Superrenches" now embodies a completely new conception in wrench proportions. A redistribution of weight has created exceptional balance through slimmer heads, longer and narrower handles. These improvements make this line of wrenches more comfortable to work with and permit nut rotation in more difficult and confined quarters. Both heads have same size openings in a range of sizes from ¼ to 1⅝ in. Details on these and other wrench lines are available from this Buffalo manufacturer of industrial and automotive wrenches, tools and drop forgings by writing *J. H. Williams & Co., 400 Vulcan St., Buffalo 7, N. Y.*

Williams' Open-End Box "Superrench"

(For Convenience Circle Index Code 0503)

X-ACTO'S NEW RAZOR SAW SET

The latest addition to the X-acto line of hobby tools is a new Razor Saw Set — two razor saw blades of ¾-in. and 1-in. widths plus a No. 5 X-acto universal handle.

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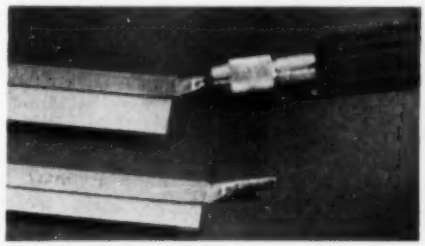
The razor saw represents an important new development in the hobby and home workshop field. It has proved itself the most useful tool available for fine and accurate crosscutting, trimming, and notching of metals, wood, and plastics;



X-Acto's New Razor Saw Set

its narrow blade and fine teeth also reduce material wastage to a minimum.

The angle at which the blade is joined to the handle, permits closer work in corners, provides longer tool reach (over-all length of 9½ in.), and prevents the barking of knuckles so common in work with straight backsaws.

For further information write to *X-acto, Inc., 48–41 Van Dam St., Long Island City 1, N. Y.*

(For Convenience Circle Index Code 0504)

NEW LUFKIN MASTER PRECISION LEVEL NO. 59

As precision alignment is essential to exact duplication of parts and is also an important factor in preventing excessive machinery wear, the new Lufkin Master Precision Level, No. 59, has wide application in the metalworking industry — in machine shops, inspection departments, toolrooms, and millwright departments. This precision level gives great accuracy: the ground

(Continued on next page)

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7005	12"x12"x11"	2	3 hrs.	$205.00
7007	15"x15"x16½"	3	4 hrs.	$410.00
7009	12"x12"x 5½"	1	4 hrs.	$105.00

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SHOP EQUIPMENT NEWS

(Continued from previous page)

and graduated vial is of ten second accuracy, with one division equaling .0005 of an inch per foot. The special alloy base is affected very little by temperature changes and the top plate is made of special nonconductive insulating material. Extra sensitive screws have 64 threads

New Lufkin Precision Level

per inch for fine, positive adjustments. Auxiliary level shows lateral position. The base is made from thoroughly seasoned castings, and it is designed to give maximum protection to the vials. Machined surfaces are scraped with extreme care. Nonmachined surfaces have durable black crackle finish.

This level is 15 in. long, 3 in. high, and 1½ in. wide, and weighs approximately 6 pounds. It is packed in a substantial, well-finished wooden box with hinged cover.

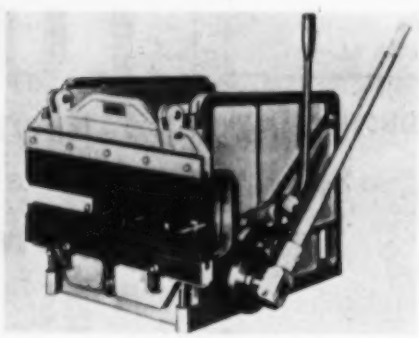
Lufkin Rule Co., Saginaw, Mich.

(For Convenience Circle Index Code 0505)

NEW HAND OPERATED DI-ACRO PRESS BRAKE

A new 24-in. hand operated press brake rated at eight-ton capacity has been announced by O'Neil-Irwin Mfg. Company.

Designated Di-Acro Press Brake, this machine incorporates a special cam lever mechanism which provides ample power for forming, blanking, piercing, drawing, and trimming operations plus a ratchet drive system that greatly multiplies the power for heavy forming jobs.



New Hand Operated Di-Acro Press Brake

This hand operated Press Brake will form 16-gauge mild sheet steel across the full 24-in. forming width, No. 10 gauge mild sheet steel across a 12-in. forming width, as well as inconel, brass, aluminum, stainless steel, chrome molybdenum, and other ductile materials.

Other features of this brake are: width of stroke — 24 in.; stroke of ram — 2 in.; depth of throat — 6 in.; width between housings — 14 in.; bearings — Torrington roller; ram guides — hardened steel and precision ground; and bed adjustment — 1½ in.

For further information write to *O'Neil-Irwin Mfg. Co., 544 Eighth Ave., Lake City, Minn.*

(For Convenience Circle Index Code 0506)

(Continued on page 62A)

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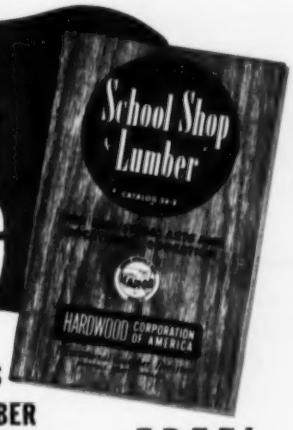

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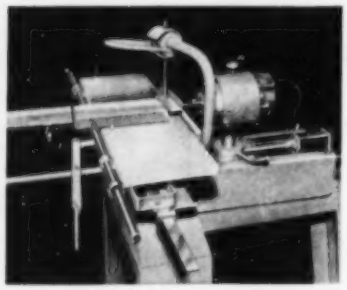
SHOP EQUIPMENT NEWS

(Continued from page 60A)

THE NEW WALLACE ROUTISER

J. D. Wallace & Company announce the development of an entirely new kind of woodworking machine, called the Routiser, for making wood joints

It does the work of a mortiser and a tenoner, or a dowel-boring machine, at a fraction of the cost.



The Wallace Routiser

The Wallace Routiser mortises both stiles and rails. All parts are mortised on the same machine, same setup, same surface to the table, so parts joined flush up perfectly. A two-position table gauge positions the material for right- and left-hand cuts, alternately, with one setup.

For further information write to *J. D. Wallace & Co., Dept. IAVE, 134 S. California Ave., Chicago 12, Ill.*

(For Convenience Circle Index Code 0507)

THE NEW MICO MICROMETER-TYPE FLY CUTTER

The Mico Instrument Company announces the latest addition to their line of Mico Hole-Cutting Tools, known as the Mico Micrometer-Type Fly Cutter, Cat. No. 805. This precision tool is designed for power tool use with such machines as electric drills and drill presses. The fly cutter is constructed entirely of steel with a ½-in. diameter shank and uses a 3/16-in. diameter high-speed steel cutting bit.

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(Continued on page 64A)

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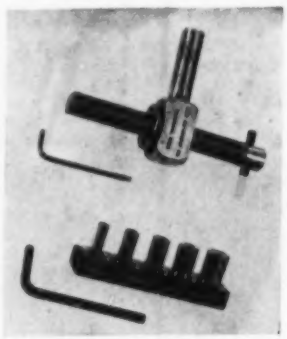

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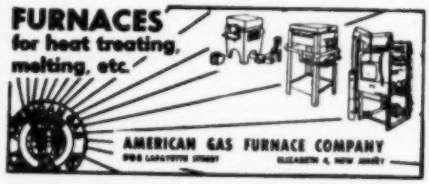

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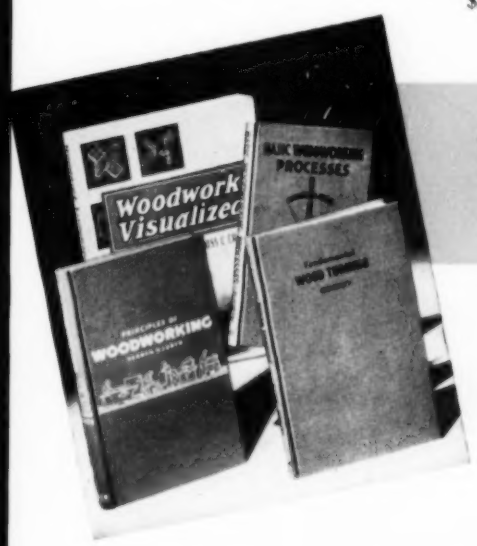

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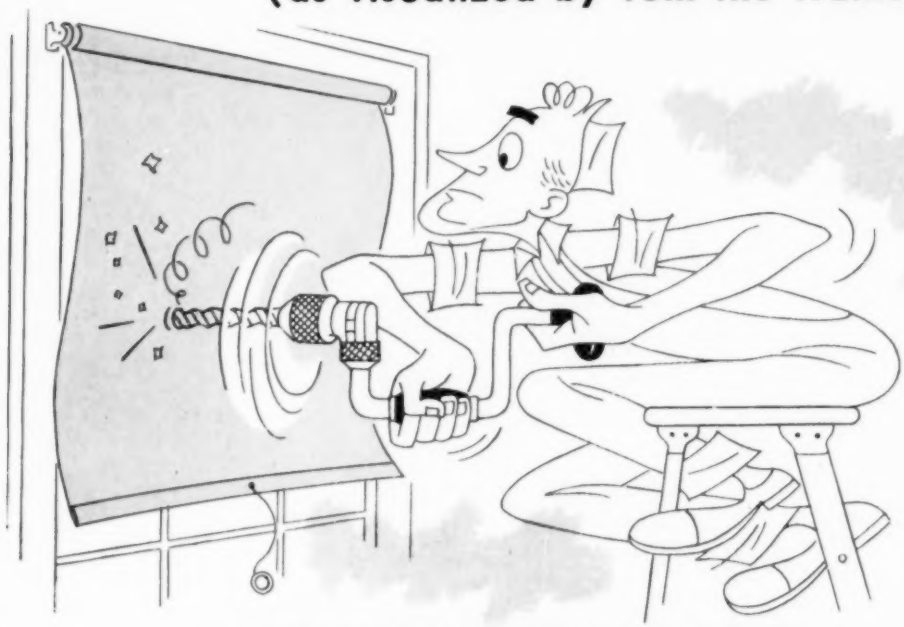

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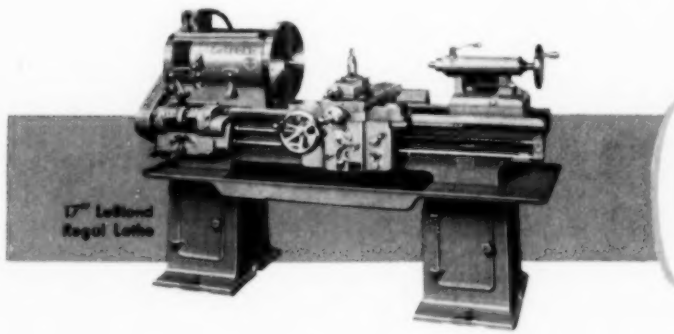

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